

7<sup>th</sup> Annual Vietnam Education Foundation

Fellows and Scholars Conference

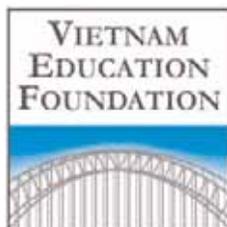
# Leaders of the Future: Entrepreneurs

January 3 – 5, 2010  
Troy, New York, USA

Hosted by Rensselaer Polytechnic Institute



VEF: Bringing the United States and Vietnam closer together through educational exchange



Rensselaer





## TABLE OF CONTENTS

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# Rensselaer

|   |    |
|---|----|
| Welcome from VEF  | 2  |
| Agenda  | 3  |
| Guest Speaker Bios  | 10 |
| U.S. Faculty Scholar Teaching Programs and Bios                   | 16 |
| Job Fair Delegations  | 18 |
| Tour Descriptions   | 19 |
| Vietnam Education Foundation                                      |    |
| 1. Overview   | 21 |
| 2. VEF Board of Directors   | 23 |
| 3. VEF Staff  | 24 |
| 4. U.S. Universities of VEF Fellows, Fall 2009                    | 25 |
| 5. VEF Alliance of U.S. Universities                              | 28 |
| 6. History of VEF Annual Conferences                              | 31 |
| 7th Annual VEF Fellows and Scholars Conference Planning Committee | 32 |
| Invited Session Abstracts   | 33 |
| Scientific Session Abstracts                                      | 36 |
| Maps  | 65 |

# WELCOME

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January 2, 2010

Dear Conference Participants,

We are very pleased to welcome you to the 7th VEF Annual Fellows and Scholars Conference, hosted by Rensselaer Polytechnic Institute (RPI). We are sure that you will agree that this is an excellent beginning for the 2010 New Year!

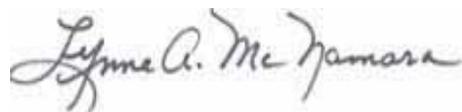
Approximately 250 participants will enjoy the benefits of this year's Conference, the majority of whom are nearly 200 Fellows along with VEF Visiting Scholars and U.S. Faculty Scholars. In addition, we are grateful for the participation of the representatives of the Vietnamese government, the guest speakers, the RPI faculty and administrators, and the Job Fair delegations.

The focus of this year's conference is leadership and entrepreneurship. Outstanding speakers will contribute their expertise and their enthusiasm to the related topics. Besides these presentations, the VEF Annual Conference provides superb networking opportunities among our Fellows, Visiting Scholars, and Faculty Scholars and the other conference participants. The VEF Annual Conference also provides the opportunity for the Fellows and Visiting Scholars to share their research during the Scientific Sessions and to discuss their return to Vietnam in the sessions entitled, All The Ways Home. Now becoming a regular part of the VEF Annual Conference, the Job Fair provides the chance for organizations to talk to Fellows about potential internships and employment opportunities.

We are extremely appreciative of the hard work and efforts of the Conference Planning Committee (CPC), which consists of the following: all of the VEF staff (4 in the U.S. and 8 in Vietnam), headed by the VEF Conference Coordinator, Suzanne Michaels; the 30 VEF Fellows Association (VEFFA) representatives (chairs of 7 committees and 23 others, who help the chairs), headed by Dung T. Hong; and the numerous RPI staff, headed by Connie Grega. We are especially grateful to RPI for providing the leadership training experiential workshops through the RPI Archer Center for Student Leadership Development and the Strategic Communications Office for providing assistance with the Conference Book. In addition, we wish to acknowledge that VEFFA handled all of the arrangements and details for the Scientific Sessions, the All the Ways Home sessions, the Recreational Activities, and the Gala Dinner. We are extremely grateful to each person on the CPC for volunteering many hours to the success of this conference.

Thank you for joining us! We know that you will enjoy the efforts of many in presenting to you this year's VEF Annual Conference!

Sincerely,



Dr. Lynne McNamara  
VEF Executive Director



Dr. Steve Maxner  
Chairman, VEF Board of Directors



7th Annual Vietnam Education Foundation  
Fellows and Scholars Conference

January 3 - 5, 2010

LEADERS OF THE FUTURE: ENTREPRENEURS

Host University: Rensselaer Polytechnic Institute (RPI)

**SATURDAY, JANUARY 2, 2010**

JOB FAIR 2:00 pm – 9:00 pm (The Desmond, King Street Courtyard)

|                    |   |                          |
|--------------------|---|--------------------------|
| 2:00 pm – 9:00 pm  | CONFERENCE CHECK-IN   | (The Desmond, Room 112)  |
|                    | Fellows and Visiting Scholars must sign up for appointments for optional evening immigration advising with <b>Sandarshi Gunawardena</b> , VEF Program Officer |                          |
| Evening            | DINNER ON YOUR OWN  |                          |
| 2:00 pm – 11:00 pm | FELLOWS NETWORKING/BOOK DRIVE   | (The Desmond, The Lodge) |

**SUNDAY, JANUARY 3, 2010**

JOB FAIR 7:30 am – 6:00 pm (DCC, Great Hall)

|                   |                                  |                                      |
|-------------------|----------------------------------|--------------------------------------|
| 7:00 am – 7:15 am | BUSES DEPART THE DESMOND FOR RPI | (at the Desmond entrance)            |
| 7:15 am – 7:30 am | BUSES ARRIVE AT RPI              | (JEC Circle)                         |
| 7:15 am – 8:15 am | BREAKFAST BUFFET                 | (DCC, Great Hall, Rooms 308 and 318) |
| 8:30 am – 9:15 am | CONFERENCE WELCOMING REMARKS     | (DCC, Room 308)                      |

**Dr. Lynne McNamara**, VEF Executive Director  
**Dr. Stephen Maxner**, Chair, VEF Board of Directors  
**Dr. Stanley Dunn**, Vice Provost and Dean of the Graduate School, RPI  
**Dr. Robert E. Palazzo**, Provost, RPI  
**Dr. Shirley Ann Jackson**, President, RPI  
**Dr. Nguyen Quan**, Vice Minister, Vietnam Ministry of Science and Technology  
**Dr. Nguyen Xuan Vang**, Director General of the Vietnam International Education Department, Vietnam Ministry of Education and Training

# AGENDA

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|                     |   |  |
|---------------------|---|--|
| 9:15 am – 10:15am   | IMMIGRATION MATTERS + Q&A<br><b>Ms. Sandarshi Gunawardena</b> , VEF Program Officer   | (DCC, Room 308)  |
| 10:15 am – 10:30 am | BREAK   | (DCC, Great Hall)  |
| 10:30 am – 11:00 am | U.S. FACULTY SCHOLAR PRESENTATIONS<br><b>Dr. Lynne McNamara</b> , VEF Executive Director  | (DCC, Room 308)  |
|                     | <b>2009 U.S. Faculty Scholars:</b><br><b><u>GRANT #1 - Team Teaching - Spring 2010 - Videoconferencing</u></b><br>Location: Thai-Binh Medical University<br>Course Title: Fundamentals of Clinical Surgery<br><br><b>Dr. Quyen D. Chu, M.D., F.A.C.S.<sup>1</sup></b> , Associate Professor, Louisiana State University<br>Health Sciences Center-Shreveport<br>Field: General Surgery and Surgical Oncology<br><br><b>Dr. Hung S. Ho, M.D., F.A.C.S.</b> , Professor, Surgery Clinic at University of California,<br>Davis, School of Medicine<br>Field: Surgery |  |
|                     | <b><u>GRANT #2 - Academic Year 2009-2010 - On-site in Vietnam</u></b><br>Location: Hanoi Water Resources University<br>Course Titles: (1) Basic Hydrology; (2) Water Resources Planning and Management;<br>and (3) Regional Regression Flood Equation Development<br><br><b>Dr. Findlay G. Edwards, Ph.D.</b> , Associate Professor, University of Arkansas<br>Field: Environmental Engineering   |  |
| 11:00 am – 11:15 am | VEF VIETNAM OPENCOURSEWARE PROJECT (VOCW)<br><b>Mary Lou Forward</b> , Executive Director, OpenCourseWare Consortium<br>Presentation: <i>Improving International Understanding through Sharing Educational Resources</i>  | (DCC, Room 308)  |
| 11:15 am – 12:15 pm | KEYNOTE ADDRESS<br><b>Robert Chernow</b> , Vice Provost for Entrepreneurship, RPI<br>Presentation: <i>Leaders of the Future: Entrepreneurs</i>  | (DCC, Room 308)  |
| 12:15 pm – 1:15 pm  | LUNCH<br><br>Optional: Open Discussion with Faculty Scholars<br><b>Dr. Quyen D. Chu</b> and <b>Dr. Hung S. Ho</b><br><b>Dr. Findlay G. Edwards</b>  | (DCC, Great Hall and Room 318)<br><br>(DCC, Room 324)<br>(DCC, Room 330) |
| 12:15 pm – 1:15 pm  | IMMIGRATION ADVISING<br><b>Sandarshi Gunawardena</b> , VEF Program Officer<br>(No Appointment Needed)   | (DCC, Great Hall at Jazzman's<br>Café)                                   |

|   |                     |                  |
|---|---------------------|------------------|
| 1:30 pm – 6:00 pm   | SCIENTIFIC SESSIONS | (RPI, DCC Rooms) |
| <i>The parallel sessions on the following page focus on scientific fields, beginning with presentations by RPI faculty, followed by multiple individual presentations by Fellows, Visiting Scholars, and other speakers, organized by VEFFA according to specific fields.</i> |                     |                  |

1:30 pm – 2:30 pm

PRESENTATIONS BY RPI FACULTY (FIVE PARALLEL SESSIONS)

**Anna Dyson**, Associate Professor (DCC, Room 337)  
 Department of Architecture  
**“Next Generation Environmental and Energy Systems for Buildings”**  
 Session Chair: Loc X. Bui

**Dr. Kim Fortun**, Associate Professor (DCC, Room 330)  
 Department of Science and Technology Studies  
**“Historical and Cultural Perspective on Environmental Informatics”**  
 Session Chair: Thuy T.H. Nguyen

**Dr. Shekhar S. Garde**, Elaine and Jack S. Parker Chaired (DCC, Room 324)  
 Professor and Department Head  
 Chemical and Biological Engineering  
**“Adventures of a Chemical Engineer into the Land of Molecules: From Carbon Nanotubes and Proteins to Moviemaking”**  
 Session Chair: Huong T.N. Le

**Dr. Robert J. Linhardt**, Constellation Chair/Professor (DCC, Room 318)  
 Chemistry and Chemical Biology, Chemical and Biological Engineering, and Biology  
**“Heparin and Heparan Sulfate: New Approaches in Glycoengineering”**  
 Session Chair: Trung D.C. Cao

**Dr. George I. Makhatadze**, Professor of Biology, (DCC, Room 308)  
 Chemistry and Chemical Biology  
 Chaired Constellation Professor in Biocomputation and Bioinformatics  
**“Computational Design of Thermostable Enzymes for Use in Biotechnology and Medicine”**  
 Session Chair: Liem M. Phan

2:30 pm – 2:45 pm

BREAK

(DCC, Great Hall)

2:45 pm – 6:00 pm

INDIVIDUAL PRESENTATIONS BY VEF FELLOWS, VISITING SCHOLARS,  
 AND NON-VEF SPEAKERS

*(Seven parallel oral/poster tracks according to field with multiple speakers in each session.)*

| Parallel Sessions with Multiple Presentations                      | Session Chairs                                    | Location |
|--|---|----------|
| 1. Electrical Engineering  | Kien C. Nguyen                                    | DCC 308  |
| 2. Computer Science  | Binh Nguyen                                       | DCC 318  |
| 3. Public Health and Biomedical Science                            | Nhan T. Ho  | DCC 324  |
| 4. Biological, Chemical, and Agricultural Science                  | Liem M. Phan and Trung D. C. Cao                  | DCC 330  |
| 5. Environmental, Earth, Atmospheric, and Natural Resource Science | Thuy T. H. Nguyen                                 | DCC 337  |
| 6. Civil, Industrial, Mechanical, and Aerospace Engineering        | Trung Q Le, Trang Nguyen, and Nguyen H. P. Nguyen | DCC 232  |
| 7. Mathematics and Physics   | Phong A. Tran                                     | DCC 239  |

# AGENDA

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|                    |  |                                     |
|--------------------|--|-------------------------------------|
| 6:15 pm – 6:30 pm  | BUSES TO THE DESMOND HOTEL   | (JEC Circle)                        |
| 7:00 pm – 9:00 pm  | DINNER ON YOUR OWN   |                                     |
| 8:00 pm – 10:00 pm | IMMIGRATION ADVISING<br><b>Sandarshi Gunawardena</b> , <i>VEF Program Officer</i><br>(By Appointment Only) | (The Desmond, Room 120)             |
| 9:00 pm – 11:00 pm | VEFFA BOARD OF REPRESENTATIVES (BOR)<br>CAMPAIGNING  | (The Desmond, Fort Orange Ballroom) |

## MONDAY, JANUARY 4, 2010

JOB FAIR 7:30 am – 2:45 pm (DCC, Great Hall)

|                    |  |  |
|--------------------|--|--|
| 7:00 am – 7:15 am  | BUSES DEPART THE DESMOND FOR RPI   | (at the Desmond entrance)                      |
| 7:15 am – 7:30 am  | BUSES ARRIVE AT RPI  | (JEC Circle)                                   |
| 7:15 am – 8:30 am  | BREAKFAST BUFFET   | (DCC, Great Hall<br>Rooms 308 and 318)         |
| 7:30 am – 8:30 am  | IMMIGRATION ADVISING<br><b>Sandarshi Gunawardena</b> , <i>VEF Program Officer</i><br>(No Appointment Needed) | (DCC, Great Hall at<br>Jazzman's Café)         |
| 8:30 am – 11:15 am | LEADERSHIP: Experiential Learning/Training Workshop  | (Meet Escorts at DCC<br>Great Hall Info Table) |

*The following are parallel sessions, conducted by the Rensselaer Archer Center for Student Leadership Development. Conference participants must attend the session to which they have been preassigned.*

| Session                                 | Facilitator        | Location                   |
|---|--------------------|----------------------------|
| 1. Elevator Pitches and Public Speaking | Tracy Schierenbeck | Biotech Ctr., Bruggeman Rm |
| 2. General Leadership Skills/Styles     | Christine Allard   | Rensselaer Union, Rm 3602  |
| 3. Goal Setting and Vision              | Graham Knowles     | Rensselaer Union, Rm 3606  |
| 4. Managing Conflict                    | James Reed         | DCC, Room 308              |
| 5. Team Development                     | Annie Virkus       | Rensselaer Union, Rm 3202  |

|                     |  |  |
|---------------------|--|--|
| 11:15 am – 12:15 pm | LUNCH  | (DCC, Great Hall<br>Rooms 308 and 318) |
| 11:15 am – 12:15 pm | IMMIGRATION ADVISING<br><b>Sandarshi Gunawardena</b> , <i>VEF Program Officer</i><br>(No Appointment Needed) | (DCC, Great Hall at<br>Jazzman's Café) |
| 12:15 pm – 12:30 pm | VEF PHOTO SESSION  | (DCC, Room 308)                        |

12:30 pm – 3:00 pm                      VEF FELLOWS AND SCHOLARS ASSOCIATION (VEFFA) (DCC, Room 308)  
MEETING

3:15 pm                                        BUSES DEPART FOR THE DESMOND FOR THOSE NOT PARTICIPATING IN THE  
RECREATIONAL ACTIVITIES OR TOUR

3:15 pm – 6:30 pm                      CHOICE OF EVENTS:  
**RECREATIONAL ACTIVITIES or ON-CAMPUS TOURS**  
*You may go to the recreational activities as an observer or cheer leader. Players should have signed up in advance with the VEFFA organizers. If you are participating in the On-Campus Tours, you should have already signed up in advance. All locations listed are included in the tour description section with some limitations on capacity.*

I. RECREATIONAL ACTIVITIES AT RPI

(Meet Escorts at DCC  
Great Hall Info Table)

| Event                   | Coordinator                              | Location          |
|-------------------------|--|-------------------|
| Soccer Tournament       | Le Ro To (Fellow 2007)                   | '87 gym west      |
| Badminton Tournament    | Le Truong Son (Fellow 2007)              | '87 gym east      |
| Volley Ball Tournament  | Nguyen Minh Chon (Visiting Scholar 2009) | '87 gym east      |
| Table Tennis Tournament | Nguyen Trong Hai (Fellow 2008)           | RPI student union |
| Billiards Tournament    | Nguyen Tien Dat (Fellow 2006)            | RPI student union |

**OR**

2. ON-CAMPUS TOURS

(Meet Escorts at DCC  
Great Hall Info Table)

- Rensselaer Incubation Program
- The Center for Biotechnology and Interdisciplinary Studies
- NSF Nanoscale Science and Engineering Center
- Smart Lighting Engineering Research Center

6:30 pm – 6:45 pm                      BUSES DEPART TO THE DESMOND HOTEL                      (JEC Circle)

7:30 pm – 9:00 pm                      DINNER ON YOUR OWN

8:00 pm – 10:00 pm                      IMMIGRATION ADVISING                      (The Desmond, Room 120)  
**Sandarshi Gunawardena**, VEF Program Officer  
(By Appointment Only)

9:00 pm – 11:00 pm                      NETWORKING, OPEN DISCUSSION FORUMS,                      (The Desmond, The Lodge)  
MEETING JOB FAIR DELEGATES



# AGENDA

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|                    |  |   |
|--------------------|--|---|
| 1:15 pm – 2:15 pm  | BOXED LUNCH  | (DCC, Great Hall and Room 308)                              |
| 1:15 pm – 2:15 pm  | IMMIGRATION ADVISING<br><b>Sandarshi Gunawardena</b> , <i>VEF Program Officer</i><br>(No Appointment Needed)   | (DCC, Great Hall at Jazzman's Café)                         |
| 2:00 pm – 4:00 pm  | RECREATIONAL ACTIVITIES<br>Final Tournament  | ('87 gym - meet at DCC Great Hall Info Table for Escort)    |
| 2:00 pm            | BUS DEPARTS FOR OFF-CAMPUS TOUR  | (JEC Circle - meet at DCC Great Hall Info Table for Escort) |
| 2:15 pm – 2:30 pm  | BUS TO THE DESMOND HOTEL   | (JEC Circle)  |
| 2:30 pm – 5:00 pm  | <b>OPTIONAL OFF CAMPUS TOUR:</b> VICARIOUS VISIONS, ALBANY, NY<br>(ONLY FOR THOSE PRE-REGISTERED FOR THE TOUR. LIMITED NUMBERS BASED ON THOSE WHO REGISTERED FIRST)  |   |
| 4:15 pm            | BUSES TO THE DESMOND HOTEL   | (JEC Circle)  |
| 6:30 pm – 7:00 pm  | GALA DINNER RECEPTION  | (The Desmond, King Street Courtyard)                        |
| 7:00 pm – Midnight | GALA DINNER  | (The Desmond, King Street Ballroom)                         |
|                    | CONFERENCE CLOSING REMARKS<br><b>Dr. Lynne McNamara</b> , <i>VEF Executive Director</i><br><b>Dr. Stephen Maxner</b> , <i>Chair, VEF Board of Directors</i><br><b>Dr. Stanley Dunn</b> , <i>Vice Provost and Dean of the Graduate School, RPI</i><br><b>New VEFFA President</b> , <i>New VEFFA BoR</i> |   |

## WEDNESDAY, JANUARY 6, 2010

Morning and Afternoon      Departures

## GUEST SPEAKERS

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### Robert A. Chernow

Rob Chernow is currently the Vice Provost for Entrepreneurship at Rensselaer Polytechnic Institute (RPI) in Troy, NY, a position he assumed in Jan. 2006. The year before, Rob was awarded an “Atlantic Fellowship” by the Chancellor of the Exchequer in the United Kingdom to develop recommendations to help the UK become a more enterprising (entrepreneurial) nation, and he traveled extensively throughout the UK and Europe.

Before going to the UK, Rob was the Senior Vice President of Entrepreneurship at the Kauffman Foundation (the largest foundation in the world dedicated to fostering entrepreneurship), where he was responsible for directing all entrepreneurship programs. Rob has consulted with more than fifty colleges and universities (including directly with 18 college presidents) on entrepreneurship both here and abroad, as well as with the OECD and the United Nations.

Rob has over thirty years of entrepreneurial and business related experience, both in the domestic and international arenas. Prior to joining Kauffman, he was the founder and president of two health care IT companies, one domestic and one international (Corporate Health Strategies and World Specialists Online); President of two major health care companies (MetLife’s Managed Care Group and The New York Presbyterian Health Care System, the largest hospital system at the time in the nation). Later, he was a Partner for PricewaterhouseCoopers, where he directed their international health care operations, many in developing countries and Latin America. Rob was also a Peace Corps Volunteer in Brazil.

Rob did his undergraduate work at Colgate University; his Master’s at the University of California, Berkeley; and his doctorate work at Yale in Epidemiology and Public Health.

### Stanley M. Dunn, Ph.D.

Stanley M. Dunn, Ph.D., is currently Vice Provost and Dean of the Graduate School at Rensselaer Polytechnic Institute. In this capacity, he oversees more than 100 graduate programs on the Troy and Hartford campuses.

Professor Dunn holds a B.S. in Electrical Engineering and a B.S. in Computer Science both from Drexel University (1979), a M.S. in Computer Science (1983) and Ph.D. in Computer Science (1985) both from the University of Maryland and a Ph.D. in Imaging Science from the Vrije Universiteit te Amsterdam (Free University of Amsterdam), the Netherlands, in 1993.

Prior to joining Rensselaer in 2008, he was Professor of Biomedical Engineering and the Paul S. and Mary W. Monroe Faculty Scholar in the School of Engineering at Rutgers University. Professor Dunn joined Rutgers in 1986 and held appointments in the Department of Biomedical Engineering, with graduate faculty appointments in Electrical and Computer Engineering, and an appointment in Computer Science. From 2001 to 2008 he was the director of the Center for Packaging Science and Engineering.

Dr. Dunn has written three books, edited two volumes, written 5 book chapters, has 76 refereed publications, 75 conference papers and 81 conference abstracts. He has mentored 14 Ph.D. students, 23 M.S. Students and many undergraduate students. These students have come from Biomedical Engineering, Electrical and Computer Engineering, Computer Science, Mathematics, Dentistry, as well as the MD/Ph.D. program. He has served on thesis committees in all of these areas as well as Food Science and Environmental Science.

### Anna Dyson

Anna Helen Dyson is the Director of the Center for Architecture Science and Ecology (CASE), an entity spanning several institutional collaborators, and co-hosted by Skidmore Owings and Merrill (SOM) and Rensselaer Polytechnic Institute. The mission of CASE is to create an exceptional context for interdisciplinary innovation of high-performing building technologies, by uniting multiple (typically disparate) interests across the building disciplines, both industrial and academic, in order to support common interests for innovation. CASE is collaborating with several industrial collaborators on next-generation environmental systems development and their demonstration and deployment on several building projects world wide. Dyson is currently directing interdisciplinary research funded by the U.S. Department of Energy, the New York State Energy Research and Development Authority, and the New York State Foundation for Science, Technology and Innovation to develop building systems that integrate applications from diverse research fields.

### Kim Fortun, Ph.D.

Kim Fortun is an associate professor and a cultural anthropologist in Rensselaer's interdisciplinarity Science and Technology Studies Department. Fortun specializes in anthropological studies of environmental politics and the environmental sciences. She received her Ph.D. in cultural anthropology from Rice University in 1993.

Fortun has served as an Associate Dean of Research and Graduate Studies at Rensselaer, and is now co-editor of *Cultural Anthropology*, the journal of the Society for Cultural Anthropology, a leading section of the American Anthropological Association. She is author of *Advocacy After Bhopal: Environmentalism, Disaster, New Global Orders* (Chicago 2001), winner of the 2003 biannual Sharon Stephens Prize awarded by the American Ethnological Society.

Fortun's research has examined how people in different geographic and organizational contexts understand environmental problems, uneven distributions of environmental health risks, developments in the environmental health sciences, and factors that contribute to, and reduce, vulnerability to environmental risk and disaster. Her current research examines transdisciplinary dynamics in the field of environmental exposure science, and in efforts to respond to dramatic increases in asthma incidence around the world. Fortun is completing a book that examines the role of informatics in the development of environmental science and politics over the last two decades.

### Mary Lou Forward

Mary Lou Forward is the Executive Director of the Open CourseWare Consortium, providing leadership for the organization's efforts to support OpenCourseWare use and development globally. Prior to joining the Consortium, she served as Dean of African Studies for SIT Study Abroad. In that role, she provided academic and strategic leadership for 29 programs across the African continent, leading SIT's incorporation of technology and distance learning in international programming and developing innovative opportunities to collaborate across countries and between diverse student groups. Prior to that position, Mary Lou served as Academic Director for undergraduate programs in Madagascar, focused on Environmental Studies and Cultural Geography. She has also worked on community-based development in Africa, with an emphasis on the incorporation of appropriate technologies and sustainable resources in small-scale enterprise development.

### Shekhar Garde, Ph.D.

Dr. Shekhar Garde is the Elaine and Jack S. Parker Chaired Professor and Head of Rensselaer's Department of Chemical and Biological Engineering. He received his B.S. (University of Bombay, 1992) and Ph.D. (U. Delaware, 1997) degrees in Chemical Engineering. He received the prestigious Director's post-doctoral fellowship at Los Alamos National Laboratory, where he performed research from 1997 to 1999. He joined Rensselaer as an Assistant Professor in 1999. He was promoted to Associate Professor in 2004 and to Full Professor in 2006. He was appointed Elaine and Jack S. Parker Chaired Professor in 2006 and as the Head of Chemical and Biological Engineering Department in 2007. His research focuses broadly on understanding the role of water in biological structure-function, and specifically on hydration and water-mediated interactions using statistical mechanical theory and molecular modeling and simulation tools. He has received several awards including the prestigious NSF CAREER Award (2001), School of Engineering Research Award (2003), and Rensselaer Early Career Award (2004). Garde is also one of the leaders of the one-of-a-kind animation movie project called Molecularium, which aims to excite the next generation about the world of atoms and molecules. He has pioneered integration of large-scale molecular dynamics simulations into Disney-Pixar style animation world. He is an executive producer of the Molecularium I-MAX/3-D movies – *Molecules to the MAX*, which are currently being distributed nationwide.

## GUEST SPEAKERS

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### **Shirley Ann Jackson, Ph.D.**

The Honorable Shirley Ann Jackson, Ph.D., is President of Rensselaer Polytechnic Institute, in Troy, New York. She has held senior leadership positions in government, industry, research, and academe. A theoretical physicist, she was chairman of the U.S. Nuclear Regulatory Commission (1995-1999). President Obama has appointed her to serve on the President's Council of Advisors on Science and Technology. Her research and policy focus includes energy security and the national capacity for innovation, including addressing the "Quiet Crisis" of looming gaps in the science, technology, and engineering workforce and reduced support for basic research. She is a Vice Chairman of the Council on Competitiveness and co-chairs its Energy Security, Innovation and Sustainability initiative. She is past President (2004) and Chairman of the Board (2005) of the American Association for the Advancement of Science, a member of the National Academy of Engineering, the American Philosophical Society, and a Fellow of the American Academy of Arts and Sciences, the American Physical Society, and AAAS. She serves on the Board of Regents of the Smithsonian Institution, and on the Board of the Council on Foreign Relations. She is a member of the Board of Directors of global companies including IBM and FedEx. Calling her a "national treasure," the National Science Board selected her as its 2007 Vannevar Bush Award recipient for "a lifetime of achievements in scientific research, education, and senior statesman-like contributions to public policy." Dr. Jackson holds a S.B. in physics and a Ph.D. in theoretical elementary particle physics, both from M.I.T

### **Minh Hong Le**

Mr. Minh Hong Le is the Founder, Chairman, and CEO of VinaGame. He earned his bachelor's degree in finance from Monash University. In 2004 after six years of working in corporate finance and investment banking, he founded VinaGame which is a very successful game publisher and e-commerce company. He has grown VinaGame from a 10-employee start-up business to a 1,200-employee company with revenue of nearly \$60 million USD in about 4 years. VinaGame currently is the biggest online game provider and the biggest Vietnam internet portal (Zing). VinaGame has been awarded various awards for its unceasing contributions to Vietnam's online game market. In June 2007, the company was acknowledged as one of the 50 best employers in Vietnam by the Navigos Group and AC Nielsen. In addition to providing online games, VinaGame has successfully launched 123mua, an online supermarket, and Yobanbe which is the first Vietnamese only social network.

Being a young experienced leader with vision and passion, Mr. Le can share his insights on how to develop motivation and passion to achieve success.

He can also share his insights of how to build a successful career in a leading technology firm. One of Le's key staff in VinaGame is Khai Vuong the Director of the Web Service Department. Khai is a VEF alumnus (Cohort 2004) who graduated from Columbia University.

Mr. Le's experience in founding and running a successful company over the past five years will be very useful for VEF Fellows who plan to go back to Vietnam and set up their own businesses. He can share what the challenges are in starting a venture in Vietnam such as where to find investments, how to survive harsh competition, or how to create business connections outside of Vietnam.

### **Robert J. Linhardt, Ph.D.**

Robert J. Linhardt received his B.S. from Marquette University (1975), his Ph.D. degree from the Johns Hopkins University (1979) and was a postdoctoral student with Professor Robert Langer at the Massachusetts Institute of Technology (1979-1982) and served on the faculty of University of Iowa from 1982-2003. Dr. Linhardt is currently the Ann and John H. Broadbent, Jr. '59 Senior Constellation Professor of Biocatalysis and Metabolic Engineering at Rensselaer Polytechnic Institute, holding joint appointments in the Departments of Chemistry and Chemical Biology, Biology and Chemical and Biological Engineering. He also currently holds an Adjunct Professor appointment at Albany College of Pharmacy. His honors include the University of Iowa F. Wendell Miller Distinguished Professorship, Teaching Award and Iowa Regents Award for faculty excellence. He received the American Chemical Society Horace

S. Isbell Award in carbohydrate chemistry. Dr. Linhardt has received the highest award available in Pharmaceutical Sciences, the AACP Volwiler Research Achievement Award as well as the highest award in Carbohydrate Chemistry, the Claude S. Hudson Award from the American Chemical Society. He was recently named as one of the Scientific American 10 for contributions to American science and technology.

His research focuses on the structure and activity of heparin and the pharmaceutical application of enzymology in the fields of glycobiology, glycochemistry and glycoengineering. Since his arrival at Rensselaer, Dr. Linhardt has been actively involved in the emerging field of nano-biotechnology focused on developing an artificial Golgi and cellulose-based energy storage devices. In 2008 he co-founded The Paper Battery Company. Professor Linhardt has published over 485 peer-reviewed manuscripts and holds over 40 patents. Dr. Linhardt served as the Acting Director of the Rensselaer Center for Biotechnology and Interdisciplinary Studies from 2006-2008.

### George Makhatadze, Ph.D.

Dr. Makhatadze completed his postdoctoral work at the Department of Biology at the Johns Hopkins University before moving to his first faculty position in the Department of Chemistry and Biochemistry at Texas Tech University. After three years at Texas Tech he moved to the Penn State University College of Medicine, where he was Professor at the Department of Biochemistry and Molecular Biology and directed a graduate program in Chemical Biology. Dr. Makhatadze joined Rensselaer in 2007 as a Constellation Professor in Biocomputation and Bioinformatics and Professor of Biology, Chemistry and Chemical Biology.

Dr. Makhatadze co-authored over 95 peer-reviewed publications. He is on the editorial boards of the *Protein Engineering, Design and Selection*, *Biophysical Journal*, *Journal of Biomedicine and Biotechnology*, and *Proteins: Structure, Function, Bioinformatics*. He is a member of the American Chemical Society, the American Society for Biochemistry and Molecular Biology, the Biophysical Society, the Federation of American Societies for Experimental Biology, and the Protein Society. He is also a past and present member of the scientific review committees for the National Institutes of Health (NIH) and the National Science Foundation (NSF).

### Hung Quang Ngo

Professor Hung Quang Ngo (State University of New York at Buffalo) is one of the most successful Vietnamese professors in academia today. His experience is very similar to the VEF Fellows. After completing his bachelor's degree in Vietnam, he came to the U.S. to pursue a graduate degree and has become an accomplished researcher. Professor Ngo understands what the difficulties are for a Vietnamese student who pursues an academic career. He has supervised many M.S. and Ph.D. students (four of those are Vietnamese – three Ph.D. and one Master). He has published 72 papers in 12 years and has worked closely with many Vietnamese and American researchers. He is also the associate editor of *Discrete Mathematics, Algorithms and Applications (DMAA)* journal and the conference chair of Computing and Combinatory Conference (COCOON) 2009. In 2004 he received the NSF CAREER award which provides a total of \$410,000 in funding over five years.

He is currently leading two projects with five students, cooperating with two other professors (from SUNY and CMU), and one researcher from a company (Telcodia), and receiving funds from two sources (NSF and DARPA). His experience as a researcher has a very broad reach and he can instruct us on how to join or open research groups, apply for funds, and work cooperatively with other researchers.

As the Advisor of two VEF Fellows, he is a long time friend and supporter of VEF and can provide well-measured advice on working in academia and research. He also possesses a broad view about cultural and social issues that can help VEF Fellows expand their understanding of these issues.

Professor Ngo's strong enthusiasm and commitment to research and teaching is an outstanding example to all the Fellows who will return to Vietnam and make contributions to the education and scientific communities.

## GUEST SPEAKERS

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### Hoang B. Nguyen

Mr. Hoang B. Nguyen is currently the Managing Director of IDG Ventures Vietnam helping more than 40 companies in diverse areas ranging from software industry to telecommunications. As a board of management member, he provides strategic advice in technology and management. Prior to joining IDG Ventures, Mr. Nguyen was the Managing Director in Asia for VITC, a U.S. telecommunications company, specializing in IP services and technology. Before VITC, he was an Associate at Goldman Sachs in Equity Research in the Technology and Enterprise Software Group based out of New York.

Mr. Nguyen has spent over eight years in medical research, worked in protein cycle, degradation, and neurological development and was published in *The Journal of Biological Chemistry* and *Neuron*. He has an undergraduate degree from Harvard University where he attended as a Harvard National Scholar. He graduated Magna Cum Laude in 1995 with a B.A. in Classics. After Harvard, he earned his M.D. and M.B.A. from Northwestern University Medical School and the Kellogg School of Management.

Mr. Nguyen has sat on the board of more than 30 companies, reviewed hundreds of business plans, and attended many conferences. He has a broad vision about different technology areas in Vietnam (including developed technologies such as e-commerce, Internet, and biotech; as well as emerging ones such as clean tech), challenges in technology development, and the shortage of technology talent. As a former researcher in the U.S., Mr. Nguyen understands the challenges of VEF Fellows when returning from the U.S. academic environment to an emerging environment like Vietnam. With combined experience in management, technology, and investment, as well as a successful track of record in both science and business, he can provide advice and inspire VEF Fellows to follow their dreams. Mr. Nguyen cares deeply and has a passion for Vietnam technology and education development and can potentially act as a strategic partner and an advisor for VEF Fellows in finding their way back home.

### Robert E. Palazzo, Ph.D.

Robert E. Palazzo is the Provost and Chief Academic Officer at Rensselaer Polytechnic Institute, the oldest science and technology university in the United States (<http://www.rpi.edu/>). At Rensselaer he was the founding Director of the Center for Biotechnology and Interdisciplinary Studies (<http://www.rpi.edu/research/biotech/index.html>) and served as Chair of the Department of Biology.

Palazzo received his B.S. in biology and doctorate in biological sciences from Wayne State University in 1979 and 1984, respectively. He was a postdoctoral fellow at the University of Virginia and joined the Marine Biological Laboratory (MBL) in Woods Hole, MA. ([www.mbl.edu/](http://www.mbl.edu/)) as an independent scientist in 1989. He moved to the University of Kansas in 1992 where he served as Chair of the Department of Physiology and Cell Biology and Professor of Molecular Biosciences. Palazzo has authored numerous journal and conference research papers, organized conferences, and edited books, in areas such as cellular organization, cell motility, and cell replication.

In addition to teaching and research, Palazzo has worked with several public service organizations including the New York State Department of Health-Wadsworth Center, the state laboratory dedicated to science in the pursuit of health, and he has served as a member of numerous review panels for the National Institutes of Health and the National Science Foundation.

Palazzo has a long history in public policy. He served as President of the Federation of American Societies for Experimental Biology (FASEB), which represents 22 societies and more than 80,000 scientists in Washington, D.C., ([www.faseb.org/](http://www.faseb.org/)). He is a member of the American Society of Biochemistry & Molecular Biology (ASBMB) Public Affairs Advisory Committee, and the American Society for Cell Biology (ASCB) Public Policy Committee. Through his various activities, Palazzo has been a strong advocate for science research and education.

Palazzo has served on numerous Boards including the Board of Directors of FASEB, the Board of Directors for the Alliance for Science and Technology Research in America (ASTRA), as Chair of the Science Council and ex officio member of the Board of Trustees for the MBL, and on the Board of Advisers for *Scientific American* magazine.

### **Dr. Nguyen Quan, Vice Minister, Vietnam Ministry of Science and Technology (MOST)**

Dr. Nguyen Quan was born at Kim Son, Ninh Binh.

He was educated at the Ha Noi University of Technology where he received a B.S. in electrical technology. He also received a Ph.D. in thermoelectric technology from the Asia Institute of Technology-AIT.

Before entering the Ministry of Science and Technology (MOST), he worked as a lecturer at the Ha Noi University of Technology and technical adviser for the Vietnam Air Force.

He was appointed Vice Chancellor and elected the Chairman of the Trade Union of the Ha Noi University of Technology (1989-2003) and the Director General for the Personnel and Organization Department of MOST (2003-2007). Since October 2007, Dr. Nguyen Quan has served as the Vice Minister for Science and Technology appointed by the Prime Minister.

His main responsibilities within MOST are as follows: development of the organization and workforce for science and technology, intellectual properties and technology transfer, and development of technology markets.

Dr. Quan is also a member of many national committees and councils including the National Trademark Council, National Steering Committee for Nutrition, and Organizing Board for the International Fair for Vietnam Industrial Goods.

Vice Minister Nguyen Quan is married with two children.

### **Dr. Nguyen Xuan Vang, Director General of the Vietnam International Education Development (VIED) of the Ministry of Education and Training (MOET) of Vietnam**

He received two bachelor degrees: one in English Studies from Hanoi University of Foreign Studies and one in Linguistics from Hanoi University. He also attended universities in England and Australia for his graduate studies.

Dr. Vang has extensive experience in higher education and was appointed Director of the ESP Resource Center in 1991, Vice President of Hanoi University of Foreign Studies in 1997, and President of Hanoi University of Foreign Studies in 2000. He served Hanoi University of Foreign Studies for two terms (2000-2008) and has made significant contributions to upgrade Hanoi University of Foreign Studies to Hanoi University in 2006.

He was appointed Director General of the Vietnam International Education Development (VIED) of the Ministry of Education and Training (MOET) and is responsible for international education development for the higher education sector of Vietnam. Dr. Vang was entrusted by the Minister of Education and Training to send 10,000 Vietnamese university staff overseas for doctoral studies by 2020.

During his 30 years of service, Dr. Nguyen Xuan Vang has received a number of awards from the Presidents of Vietnam, Italy, Spain, and Brazil and honorary professorships from a number of foreign universities.

Dr. Nguyen Xuan Vang is married with two children.

# U.S. FACULTY SCHOLARS

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## Cohort 2009

### GRANT #1 - TEAM TEACHING - SPRING 2010 - VIDEOCONFERENCING

1. Quyen D. Chu, M.D., F.A.C.S.<sup>1</sup>, Associate Professor  
Louisiana State University Health Sciences Center-Shreveport  
Field: General Surgery and Surgical Oncology
2. Hung S. Ho, M.D., F.A.C.S., Professor  
Surgery Clinic at University of California, Davis, School of Medicine  
Field: Surgery

#### **Teaching Program in Vietnam:**

Teaching model: Videoconferencing  
Course: Fundamentals of Clinical Surgery

Vietnamese university: Thai Binh Medical University, Thai Binh  
Course dates: February - June 2010 (Spring term)

### GRANT #2 - ACADEMIC YEAR 2009-2010 - ON-SITE IN VIETNAM

3. Findlay Gordon Edwards, Ph.D., Associate Professor  
University of Arkansas  
Field: Environmental Engineering

#### **Teaching Program in Vietnam:**

Teaching model: Face-to-face  
Courses:  
1) Basic Hydrology (Fall term)  
2) Water Resources Planning and Management (Fall term)  
3) Regional Regression Flood Equation Development (Spring term)

Vietnamese university: Water Resources University, Hanoi  
Course dates: August 2009 - May 2010 (Academic year)

**Dr. Quyen D. Chu, M.D., F.A.C.S, Associate Professor, Louisiana State University Health Sciences Center-Shreveport**  
**Field: General Surgery and Surgical Oncology**

Dr. Chu is the Chief of Surgical Oncology, Director of Peritoneal Malignancies Program, the Albert Sklar Endowed Professor of Surgery, and Associate Professor of Surgery at Louisiana State University Health Sciences Center-Shreveport. He graduated from Dartmouth College, received his M.D. from Brown University School of Medicine, did his residency training at St. Elizabeth's Medical Center, Boston, and completed his Surgical Oncology fellowship at Roswell Park Cancer Institute, Buffalo, New York.

He has published over 100 articles/abstracts and 7 book chapters. He was the recipient of over 20 awards, some of which include the Dartmouth Scholars Award, Brown Faculty Scholars Award, and the Brown University/Bank of America Community Fellows Awards. He was the recipient of the prestigious ASCO 2009-2010 Leadership Development Program. He was also named as America's Top Surgeon by the Consumers' Research Council of America in 2007 & 2008, USA Today 2009 "Most Influential Doctors," Top Doctor by the Global Directory of Who's Who, Marquis Who's Who, and Madison Who's Who.

Dr. Chu belonged to over 10 professional organizations and has received grants totaling over \$200,000. He has mentored a number of students and residents who have gone on to win national awards such as the ASCO Foundation Merit Award.

Dr. Chu's clinical interests include management of complex abdominal cancers (pancreas, liver & bile ducts, esophagus, stomach and colorectal cancers), breast cancer, melanoma, thyroid, and soft tissue tumors (retroperitoneal tumors and extremity sarcomas). He initiated 3 clinical programs, (1) cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) for patients with peritoneal carcinomatosis (the only one in Louisiana) and (2) mammosite for patients with breast cancer, and (3) breast cancer patient navigator. His current research interests include understanding the role of the chemokine receptor CXCR4 and hypoxia in breast and pancreatic cancers, developing novel therapies to treat advanced malignancies, and seeking solutions for health care disparities.

**Dr. Hung S. Ho, M.D., F.A.C.S., Professor, Surgery Clinic at University of California, Davis, School of Medicine**  
**Field: Surgery**

Dr. Hung S. Ho is Professor of Surgery at the University of California at Davis School of Medicine and Chief of Gastrointestinal & Minimally Invasive Surgery at UC Davis Medical Center. Born and raised in Vietnam, he graduated from high school in 1976, obtained his MD degree in 1987 and completed his Surgery Residency in 1994.

Since joining UC Davis Faculty in 1994, Dr. Ho has served on the Committee on Educational Policy, the Credentials and Privileges Committee, the Institutional Review Board, the Faculty Personnel Committee, the Committee on Academic Personnel, and he was elected Chair of the Faculty twice. Nationally, he served as Chair of the Education Committee and the Committee on Issues, as a member of the Executive Council of the Association for Academic Surgery, and as a member of the Committee on Surgical Education of the Society of University Surgeon. He has been the Medical Director of the UC Davis Health System Outpatient Surgery Clinic since 1998.

Dr. Ho is the author of 62 peer review papers and 14 book chapters. His scholarly interest is cellular resuscitation and the pathophysiology of pneumoperitoneum. His clinical expertise is laparoscopic surgery, pancreatology, surgical infection and biomaterials. He has 200 presentations and been invited to lecture in Austria, Germany, Italy, Japan, Singapore and Vietnam.

**Dr. Findlay G. Edwards, Ph.D., P.E.<sup>1</sup>, Associate Professor, University of Arkansas**  
**Field: Environmental Engineering**

Dr. Edwards earned his Ph.D. at New Mexico State University studying biological degradation of aromatic hydrocarbons in airstreams, then joined the faculty at the Department of Civil Engineering at the University of Arkansas in 1999. Since then he has conducted research in the area of water treatment (stormwater, drinking water, & wastewater) while teaching classes in environmental engineering. Dr. Edwards has a broad background in engineering consulting, sales, and research; and, has worked in India, Kuwait, and Thailand. Currently (2009-2010), he is a Vietnam Education Foundation U.S. Faculty Scholar working with the Water Resources University in Hanoi, teaching classes, conducting research, and assisting with the restructuring of the engineering program at WRU.

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<sup>1</sup>Professional Engineer

## JOB FAIR DELEGATIONS

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### **Ho Chi Minh City University of Industry (HUI)**

12 Nguyen Van Bao, Go Vap District  
Ho Chi Minh City, Vietnam  
<http://www.hui.edu.vn/>  
Mr. Nguyen Xuan Hoan, Vice Rector  
Email: [ngxuanhoan@hui.edu.vn](mailto:ngxuanhoan@hui.edu.vn);  
[vinhhatnhan2003@yahoo.com](mailto:vinhhatnhan2003@yahoo.com)  
Phone: 84 8 3894 0390

### **VinaGame Software Joint Stock Company**

268 To Hien Thanh, District 10  
Ho Chi Minh City, Vietnam  
Web: [www.vinagame.com.vn](http://www.vinagame.com.vn) - [www.zing.vn](http://www.zing.vn)  
Ms. Le Thi Ngoc Diep, Vice President of Human Resources  
Email: [diepltn@vinagame.com.vn](mailto:diepltn@vinagame.com.vn)  
Phone: 84 8 3866 4666

### **Institute for Computational Science & Technology (ICST)**

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CHU THI THANH TUYEN  
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Tel: +84 8-62 849 125 Fax: +84 8 - 62849 107  
Mobile: 0933 260 240  
Web: [www.icst.org.vn](http://www.icst.org.vn)  
Prof. Thanh Truong, Director  
Ms. Ly Le, VEF Fellow

### **Tan Tao University**

Tan Duc Ecity  
Ho Chi Minh City, Vietnam  
Dr. Mark Scheid, President and CEO  
Email: [pres.ttu@gmail.com](mailto:pres.ttu@gmail.com)

### **Vietnam Academy of Science and Technology (VAST)**

18 Hoang Quoc Viet, Cau Giay District  
Hanoi, Vietnam  
Web: [www.vast.ac.vn](http://www.vast.ac.vn)  
Dr. Ha Duy Ngo, Director, Personnel Department  
Email: [hdngo@vast.ac.vn](mailto:hdngo@vast.ac.vn)  
Phone: 84 4 3756 5663

### Rensselaer Incubation Program

The mission of the Rensselaer Office of Intellectual Property, Technology Transfer and New Ventures, (IP, TT & NV) which includes the Office of Technology Commercialization (OTC) and the New Ventures Incubation Program, is to:

- o Protect Rensselaer's intellectual property rights in sponsored research contracts
- o Manage the intellectual property that originates from the Rensselaer campus
- o Protect, market and out-license intellectual property
- o To companies who will proactively develop IP for introduction to the marketplace
- o To support research and education at Rensselaer and for the public good
- o Generate successful new ventures for their multiple contributions to Rensselaer and for economic growth with student involvement, sponsored research, and to produce a return on equity
- o Assist in the creation and/or incubation of companies primarily founded by students, faculty, and alumni.

The New Ventures or Incubator Program has graduated over 250 companies in its 30 year history and is used as a means to transfer Rensselaer technology to the marketplace.

### Nanoscale Science and Engineering Center for Directed Assembly of Nanostructures

*PI: Dr. Richard W. Siegel*  
*Rensselaer Polytechnic Institute*

The NSF Nanoscale Science and Engineering Center (NSEC) for Directed Assembly of Nanostructures was founded in September 2001 at Rensselaer Polytechnic Institute in collaboration with the University of Illinois at Urbana-Champaign and Los Alamos National Laboratory. Our NSEC addresses the fundamental scientific issues underlying the design and synthesis of nanostructured materials, assemblies, and devices with dramatically improved capabilities for many industrial and biomedical applications. Directed assembly is the fundamental gateway to the eventual success of nanotechnology. Therefore, our NSEC strives to discover and develop the means to assemble nanoscale building blocks with unique properties into functional structures under well-controlled, intentionally directed conditions. We combine theory and computational design with experimentation to focus on discovery of novel pathways to assemble functional multiscale nanostructures with junctions and interfaces among structurally, dimensionally, and compositionally different building blocks. Our NSEC integrates research, education, and technology dissemination to serve as a leading national and international resource for fundamental knowledge and applications in nanoscale science and technology.

Our NSEC research program consists of three coordinated interdisciplinary and inter-institutional thrusts: 1) Nanoparticle Gels and Polymer Nanocomposites focuses on the synthesis, phase behavior, structure, and assembly of organic and inorganic nanoparticles with homogeneous or heterogeneous surfaces by means of chemical and/or physical control; 2) Nanostructured Biomolecule Composite Architectures is focused on incorporation of biological macromolecules into nanocomposite materials to enable specific applications, including directed assembly based on biorecognition and biocatalysis, which impact tissue engineering, biosensing, self-cleaning and self-repair capabilities, and the design of novel lamellar structures; and 3) Serving Society through Education and Outreach has as its goal to serve society by raising public science literacy through informal and formal education, and reaching a diverse audience to broaden the technical reach of our NSEC through programs that are carefully designed to integrate nanotechnology research with education, and enhancing the responsible, safe, and efficient transfer of nanotechnology developments to industry, the primary route through which society can benefit from the fruits of our research.

### Vicarious Visions

Vicarious Visions, a creator of video and computer games with its home office in Albany, New York, is often described as a company that pushes technical boundaries. They have pioneered new tools and technology in the process of developing commercially successful games. This highly successful game development company, founded in the RPI incubator technology park, has developed five games that have sold more than one million units each. **NOTE: Pre-registration is required for this tour.**

# TOUR DESCRIPTIONS

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## The Center for Biotechnology and Interdisciplinary Studies Building (CBIS)

The Center for Biotechnology and Interdisciplinary Studies building (CBIS) opened in 2005. The mission of the CBIS is to support “Discovery and Innovation at the Interface of the Life Sciences and Engineering.”

The 218,000-square-foot Center houses almost 400 research faculty, staff and students from several different academic departments, including Biology, Chemistry, Chemical Engineering, Biomedical Engineering and Physics. CBIS contains seven state-of-the-art research core facilities that are available to all researchers on campus and throughout the Capital Region. These research cores include Nuclear Magnetic Resonance (NMR), Proteomics, Microbiology and Protein Production, Analytical Biochemistry, BioResearch (Animal Science), Cell and Molecular Biology, Microscopy and BioImaging.

The CBIS membership includes more than 60 Rensselaer faculty and staff, approximately half of whom reside in the Center. Research targets include Alzheimer’s Disease, heparin biochemistry & synthesis, infectious disease, protein modeling & bioengineering & purification, cancer, human stem cell therapy, nanotechnology and nervous system and bone remodeling.

The Center Director is Dr. Jonathan S. Dordick (Howard P. Isermann Professor of Chemical and Biological Engineering and Professor of Biology). The Associate Center Director and Director of Operations is Dr. Glenn M. Monastersky.

## Smart Lighting ERC

Rensselaer Polytechnic Institute’s Smart Lighting ERC is a Generation Three (Gen-3) National Science Foundation Engineering Research Center (ERC) – a program that has a nearly 25 year history of success. The Smart Lighting ERC is also the only ERC located in New York State. With our core partners at Boston University and the University of New Mexico, as well as our outreach partners at Howard University, Morgan State University, and Rose-Hulman Institute of Technology, the Smart Lighting ERC will transform the way light is used and perceived. Our innovations will not only transform the lighting and related industries, but will also create the need for new generations of engineers who are educated in the creative development and application of smart lighting systems.

We envision the creation of:

- Smart Lighting Systems that are fully controllable and tunable to enable adaptation to specific requirements, environments, and conditions.
- Smart Lighting Systems that will achieve energy conservation through optimal control of efficient, non-toxic, benign, and durable solid state light sources.

Smart light sources and advanced lighting systems will result in tremendous benefits to society including, but not necessary limited to:

- Fundamental advances in live cell bio-imaging and bio-molecule sensing
- Brilliant displays with high efficiency and large color gamut
- Increased safety in transportation systems through the implementation of ambient intelligence
- Novel modes of communication, networking, and sensing
- Reduced pollution and global warming through energy conserving, mercury-free lighting.
- Reduced dependency on sleep-inducing pharmaceuticals, reduced cancer risk, and support of the natural circadian rhythm, thereby enabling higher productivity and better quality of life

Advances will be enabled through the systematic exploration and development of smart lighting principles in three integrated research thrusts: Novel Materials, Device Technology, and System Applications and Impacts.

### March 2003 through October 2009

The Vietnam Education Foundation (VEF) was established by the U.S. Congress under the Vietnam Education Foundation Act (2000) with the purpose of establishing educational exchange activities and, thus, building the bilateral relationship between the United States and Vietnam while serving the interests of both countries. VEF is governed by a thirteen-member Board of Directors, which consists of two U.S. Senators, two U.S. Representatives, three U.S. cabinet members, and six members from the U.S. citizenry appointed by the President of the United States. The Board appoints an American Executive Director to oversee VEF operations, conducted through two highly coordinated offices: the U.S. Headquarters office in the Washington, D.C., area and the Hanoi Field office in Vietnam. VEF receives an annual budget of U.S. \$5 million from the U.S. Congress until 2018.

The VEF educational exchange programs focus on the sciences (natural, physical, and environmental), engineering, mathematics, medicine (including public health), and technology (including information technology). The following three programs are the core VEF activities: (1) Fellowship Program, which sends Vietnamese nationals to the United States for graduate degree programs, funded through cost-sharing between VEF and the U.S. universities; (2) Visiting Scholar Program, which funds Vietnamese nationals, who already hold a doctorate, to further develop their professional skills via studies, research, and/or observational activities at leading U.S. academic institutions; and (3) U.S. Faculty Scholar Program, which provides grants to U.S. professors to teach courses at Vietnamese institutions for one to two semesters by teaching on-site in Vietnam or via interactive, real-time videoconferencing from the United States. The VEF capacity building efforts focus on activities in the same fields that build the relationship between U.S. and Vietnamese institutions and government entities and that strengthen the foundations in Vietnam for the return of VEF Fellows and Visiting Scholars to their home country. While capacity building efforts through seminars and workshops initially responded to the legislative mandate for Americans to teach at Vietnamese institutions, the U.S. Faculty Scholar Program now fulfills that mandate.

The following summary provides data on select VEF activities since operations began in March 2003 through October 2009.

#### Educational Exchange Programs

- **Under the Fellowship Program**, launched in 2003, 306 outstanding Vietnamese have been selected as VEF Fellows, the majority for doctorate degrees, and placed in graduate programs in 70 top-tier U.S. research universities.
  - 81 VEF Fellows have graduated: 44 with master's degrees, 37 with doctorate degrees. Among these 81 graduates, 60 have returned to Vietnam and the rest are doing Academic Training (post-degree employment, as practical training in their field) in the United States or are pursuing another degree under other funding.
  - 107 leading U.S. research universities have joined the cost-sharing VEF Alliance.
- **Under the Visiting Scholar Program**, launched in February 2007, 26 top-level Vietnamese with doctorates have been sent to 21 major U.S. universities for a self-designed, post-doctorate level program for up to 12 months.
  - 18 have completed their professional development programs and have returned to Vietnam.
- **Under the U.S. Faculty Scholar Program**, launched in December 2007, 7 American Faculty Scholars have been selected to teach courses at 7 Vietnamese universities either on-site in Vietnam or via video conferencing from the United States.
  - 3 have completed their teaching programs.

# VIETNAM EDUCATION FOUNDATION (VEF)

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## Overview

### Capacity Building Activities

- 48 scientists/experts from 42 U.S. institutions delivered 144 lectures/presentations at 51 Vietnamese host institutions.
- 11 seminars/workshops were organized, and 29 experts, representing 16 U.S. organizations, presented at these scientific events in Vietnam.
- 8 special projects were conducted in Vietnam, including the investigation of the establishment of Centers of Excellence through the Millennium Science Initiative and the establishment of an international standard university in Vietnam.
- 2 major research reports on higher education in Vietnam were completed: (1) *Observations on Undergraduate Education in Computer Science, Electrical Engineering, and Physics at Select Universities in Vietnam*; and (2) *Observations on the Current Status of Education in the Agricultural Sciences in Vietnam*.
- The **Vietnam OpenCourseWare (VOCW)** Project was launched in December 2007 in cooperation with the Vietnam Ministry of Education and Training (MOET) and the Vietnam Advanced Software Company (VASC) together with significant input from the Massachusetts Institute of Technology (MIT) and Rice University Connexions. The VOCW project has two goals: (1) building up a repository of high quality, up-to-date teaching and learning materials that include courses developed by Vietnamese scientists and faculty members; and (2) providing easy access to open educational resources (OER) of the leading universities in the world. The VOCW materials are available for public use free of charge via the internet.
- VEF has **assisted the Vietnam International Education Development (VIED)** division of MOET by doing the following: (1) donating 2 servers to VIED; (2) providing the VEF Online Management System software; (3) training VIED staff on developing an application and selection process, which emulates that of VEF; (4) including VIED scholarship candidates in the VEF interview scheme; (5) inviting the VIED scholarship finalists to attend the VEF orientation on how to prepare effectively for the interview; and (6) inviting the VIED scholarship recipients to attend the VEF orientation on how to apply to U.S. universities.

Education is a means to a greater end: deeper knowledge and genuine understanding to expand on the past and build for the future. With this in mind, the VEF Fellows, Visiting Scholars, and Faculty Scholars are contributing to the mutually beneficial relationship between Vietnam and the United States. The efforts of VEF, combined with the active involvement of U.S. and Vietnamese scientists, engineers, and experts, are dynamically building solid connections between the United States and Vietnam. These efforts contribute in a very positive way to a bright and productive future for the U.S.-Vietnam relationship.

# VIETNAM EDUCATION FOUNDATION (VEF)

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## Board of Directors

**Stephen F. Maxner**, Ph.D. Chairman  
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Texas Tech University

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U.S. Congressman

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U.S. Secretary of State

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U.S. Congressman

**David Vitter**  
U.S. Senator

**Jim Webb**  
U.S. Senator

# VIETNAM EDUCATION FOUNDATION (VEF)

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## Staff

### VEF U.S. Office Headquarters (Arlington, Virginia, United States)

Dr. Lynne McNamara, Executive Director

Sandarshi Gunawardena, Program Officer

Suzanne D. Michaels, Administrative Assistant

Lana Walbert, Director of Finance, Accounting, and Administration

### VEF VIETNAM FIELD OFFICE (Hanoi, Vietnam)

Dr. Phuong Nguyen, Country Director

Hanh Bui, Program Assistant

Binh Dang, Program Manager

Hung Do, IT & Data Technician

Huyen Le, Deputy Director of Finance, Accounting, and Administration

Tu Ngo, IT & Data Manager

Mai Nguyen, Program Assistant

Que Nguyen, Administrative Assistant and Assistant to the Country Director

# VIETNAM EDUCATION FOUNDATION (VEF)

## U.S. Universities (57) and Departments of Currently Enrolled VEF Fellows as of Fall 2009

As of September 2009, there are 227 VEF Fellows, of cohorts 2003 through 2009, who are attending 57 U.S. universities as listed alphabetically in the table below. While the universities are listed alphabetically, the department/division at each university that has the largest number of VEF Fellows, is listed first within the Department/Division section. The number of Fellows currently enrolled at each department/division is included within parentheses.

The University of Illinois at Urbana – Champaign has the highest number of VEF Fellows enrolled (36) followed by University of Texas at Austin (12 Fellows), the University of Texas at Houston (11 Fellows), and the University of California at Berkeley (10 Fellows). While the majority of universities are members of the VEF Alliance, in some cases, the particular division or department is not part of the VEF Alliance cost-sharing agreement.

| #  | University                         | # of Fellows | Department/Division  |
|----|------------------------------------|--------------|--|
| 1  | Auburn University*                 | 1            | Agriculture Economics and Rural Sociology(1)   |
| 2  | Boston University                  | 1            | International Health** (1)   |
| 3  | Brown University                   | 6            | Physics (5); Electrical Sciences and Computer Engineering (1)  |
| 4  | California Institute of Technology | 1            | Mechanical Engineering (1)   |
| 5  | Case Western Reserve University    | 3            | Biomedical Sciences** (1); Biology (1); Materials Science and Engineering (1)  |
| 6  | Clark University*                  | 1            | International Development, Community and Environment (1)   |
| 7  | Clemson University                 | 2            | Bioengineering (1); Chemistry (1)  |
| 8  | Columbia University                | 3            | Biological Sciences** (1); Civil Engineering and Engineering Mechanics (1); Physics** (1)  |
| 9  | Cornell University                 | 6            | Plant Pathology and Plant - Microbe Biology (2); Agricultural and Biological Engineering (1); Applied Physics** (1); Molecular Biology and Genetics (1); Plant Breeding and Genetics (1) |
| 10 | Duke University                    | 2            | Biochemistry** (1); Pharmacology and Cancer Biology** (1)  |
| 11 | Emory University*                  | 1            | Biological and Biomedical Sciences (1)   |
| 12 | Florida State University           | 1            | Chemistry and Biochemistry (1)   |
| 13 | Georgia Institute of Technology    | 4            | Computer Science (3); Electrical and Computer Engineering (1)  |
| 14 | Indiana University*                | 1            | Mathematics (1)  |
| 15 | Iowa State University              | 5            | Electrical and Computer Engineering (3); Agricultural and Bio Systems Engineering (2)  |

<sup>1</sup> Division: If there are no departments, the general division will be listed

<sup>2</sup> Notations:

\* Not an Alliance School

\*\* Although this is an Alliance School, the particular division or department is not part of the VEF Memorandum of Understanding (MOU) agreement.

# VIETNAM EDUCATION FOUNDATION (VEF)

U.S. Universities (57) and Departments of Currently Enrolled VEF Fellows as of Fall 2009

| #  | University  | # of Fellows | Department/Division  |
|----|---|--------------|--|
| 16 | Johns Hopkins University                                    | 5            | Electrical and Computer Engineering (3); Geography and Environmental Engineering (1); International Health**(1)  |
| 17 | Memorial Sloan-Kettering Cancer Center                      | 1            | Cancer Biology(1)  |
| 18 | Michigan State University                                   | 5            | Cell and Molecular Biology (1); Computer Science and Engineering (1); Epidemiology (1); Mechanical Engineering (1); Physics and Astronomy (1)                            |
| 19 | New York University*  | 1            | Computer Science (1)   |
| 20 | Oklahoma State University                                   | 2            | Electrical and Computer Engineering (1); Industrial Engineering and Management (1)   |
| 21 | Pennsylvania State University                               | 2            | Health Policy and Administration (1); Statistics (1)   |
| 22 | Princeton University  | 1            | Mechanical Engineering (1)   |
| 23 | Purdue University   | 8            | Computer Science (4); Electrical and Computer Engineering (2); Mechanical Engineering (2)  |
| 24 | Rensselaer Polytechnic Institute                            | 2            | Civil and Environmental Engineering (1); Computer Science (1)  |
| 25 | Rice University   | 2            | Computer Science (1); Electrical and Computer Engineering (1)  |
| 26 | Rutgers University  | 3            | Computer Science (1); Electrical and Computer Engineering (1); Food Science (1)  |
| 27 | Texas A&M University  | 2            | Electrical and Computer Engineering (1); Mathematics (1)   |
| 28 | University at Buffalo, the State University of New York     | 1            | Computer Science and Engineering (1)   |
| 29 | University of Arizona*                                      | 1            | Electrical and Computer Engineering (1)  |
| 30 | University of Arkansas*                                     | 1            | Cell and Molecular Biology (1)   |
| 31 | University of California at Berkeley                        | 10           | Civil and Environmental Engineering (3); Mathematics (3); Electrical Engineering and Computer Sciences (1); Maternal and Child Health (1)**; Physics (1); Statistics (1) |
| 32 | University of California at Davis                           | 7            | Electrical and Computer Engineering (4); Civil and Environmental Engineering (1); Computer Science (1); Plant Sciences (1)   |
| 33 | University of California at Los Angeles                     | 3            | Mathematics** (2); Epidemiology** (1)  |
| 34 | University of California at San Diego                       | 7            | Computer Science and Engineering (3); Electrical and Computer Engineering (2); Mathematics (2)   |
| 35 | University of Chicago*                                      | 1            | Computer Science (1)   |
| 36 | University of Colorado at Denver and Health Sciences Center | 1            | Cell and Developmental Biology (1)   |
| 37 | University of Florida                                       | 7            | Mathematics** (2); Statistics**(2); Chemistry** (1); Industrial and Systems Engineering (1); Natural Resources and Environment** (1)                                     |
| 38 | University of Houston                                       | 1            | Computer Science (1)   |

# VIETNAM EDUCATION FOUNDATION (VEF)

## U.S. Universities (57) and Departments of Currently Enrolled VEF Fellows as of Fall 2009

| #            | University  | # of Fellows | Department/Division  |
|--------------|---|--------------|--|
| 39           | University of Illinois at Chicago*                  | 2            | Health Policy and Administration (1); Human Nutrition (1)  |
| 40           | University of Illinois at Urbana - Champaign        | 36           | Electrical and Computer Engineering (14); Computer Science (10); Civil and Environmental Engineering (3); Chemistry (2); Physics (2); Agricultural and Biological Engineering (1); Materials Science and Engineering (1); Mathematics (1); Mechanical Science and Engineering (1); Theoretical and Applied Mechanics (1) |
| 41           | University of Iowa                                  | 3            | Computer Science (3)   |
| 42           | University of Maryland at College Park*             | 1            | Computer Science (1)   |
| 43           | University of Massachusetts Amherst                 | 5            | Computer Science (2); Civil and Environmental Engineering (2); Nutrition (1)   |
| 44           | University of Michigan at Ann Arbor                 | 8            | Mechanical Engineering (3); Aerospace Engineering (1); Chemical Engineering (1); Civil and Environmental Engineering (1); Epidemiology** (1); Materials Science and Engineering (1)  |
| 45           | University of Minnesota                             | 4            | Chemistry (2); Chemical Engineering and Materials Science (1); Civil Engineering (1)   |
| 46           | University of Missouri - Columbia                   | 6            | Plant Sciences (3); Civil and Environmental Engineering (1); Electrical and Computer Engineering (1)   |
| 47           | University of North Carolina at Chapel Hill         | 5            | Epidemiology (2); Biochemistry and Biophysics (1); Chemistry (1); Medicinal Chemistry and Natural Products (1)   |
| 48           | University of Oklahoma                              | 1            | Civil Engineering and Environmental Science (1)  |
| 49           | University of Pennsylvania                          | 5            | Chemistry (3); Biology (1); Electrical and Systems Engineering (1)   |
| 50           | University of South Florida*                        | 1            | Environmental Engineering (1)  |
| 51           | University of Southern California                   | 3            | Computer Science (2); Geography (1)  |
| 52           | University of Texas at Austin                       | 12           | Chemical Engineering (3); Civil, Architectural and Environmental Engineering (2); Electrical and Computer Engineering (2); Aerospace Engineering and Engineering Mechanics (1); Civil Engineering (1); Computer Sciences (1); Mechanical Engineering (1); Physics (1)  |
| 53           | University of Texas at Houston                      | 11           | Epidemiology and Disease Control (4); Biomedical Sciences (2); Health Promotion and Behavioral Sciences (2); Cardiology (1); Molecular and Cellular Oncology (1); Systems Biology (1)  |
| 54           | University of Utah                                  | 7            | Chemistry (2); Computer Science (2); Bioengineering (1) Neurobiology and Anatomy (1); Physical Chemistry (1)   |
| 55           | University of Washington                            | 3            | Civil and Environmental Engineering** (1); Computer Science and Engineering (1); Molecular and Cellular Biology (1)  |
| 56           | Virginia Polytechnic Institute and State University | 1            | Genetics, Bioinformatics, and Computational Biology (1)  |
| 57           | Washington State University                         | 1            | Environmental Science and Regional Planning (1)  |
| <b>TOTAL</b> |   | <b>227</b>   |  |

# VIETNAM EDUCATION FOUNDATION (VEF)

## List of VEF Alliance Schools as of November 2009 (107)

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| #  | University   | Division/Department  |
|----|--|--|
| 1  | Arizona State University   | Ira A. Fulton School of Engineering  |
| 2  | Boston College   | Graduate School  |
| 3  | Boston University  | College of Engineering   |
| 4  | Bradley University   | Graduate School  |
| 5  | Brandeis University  | Graduate School  |
| 6  | Brown University   | Graduate School  |
| 7  | California Institute of Technology                                 | Graduate School  |
| 8  | Carnegie Mellon University   | Heinz School of Public Policy and Management   |
| 9  | Case Western Reserve University                                    | Departments of Civil Engineering.; Macromolecular Science & Engineering; Materials Science & Engineering; Biology; Chemistry; Mathematics; Physics; Statistics; Epidemiology & Biostatistics |
| 10 | Catholic University  | Graduate School  |
| 11 | Clemson University   | Graduate School  |
| 12 | Colorado School of Mines   | Graduate School  |
| 13 | Colorado State University  | Graduate School  |
| 14 | Columbia University  | School of Engineering and Applied Science  |
| 15 | Cornell University   | (1) College of Agriculture and Life Sciences; (2) College of Civil & Environmental Engineering   |
| 16 | Duke University  | Graduate School  |
| 17 | Florida International University                                   | Graduate School  |
| 18 | Florida State University   | Graduate School  |
| 19 | Fordham University   | Graduate School  |
| 20 | Georgia State University   | Graduate School  |
| 21 | Gerstner Sloan-Kettering<br>Graduate School of Biomedical Sciences | Graduate School of Biomedical Sciences   |
| 22 | Iowa State University  | Graduate School  |
| 23 | Johns Hopkins University   | (1) Whiting School of Engineering;(2) Zanvyl Krieger School of Arts and Sciences   |
| 24 | Kansas State University  | Graduate School  |
| 25 | Kent State University  | Graduate School  |
| 26 | Lehigh University  | Graduate School  |
| 27 | Louisiana State University Health<br>Sciences Center               | Graduate School  |
| 28 | Michigan State University  | Graduate School  |
| 29 | Mississippi State University                                       | Graduate School  |
| 30 | North Carolina State University                                    | Graduate School  |
| 31 | Northeastern University  | Graduate School  |
| 32 | Northern Illinois University                                       | Graduate School  |
| 33 | Northwestern University  | Graduate School  |
| 34 | Oklahoma State University  | Graduate School  |
| 35 | Old Dominion University  | Graduate School  |
| 36 | Oregon State University  | Graduate School  |
| 37 | Pennsylvania State University                                      | Graduate School  |
| 38 | Princeton University   | Graduate School  |

# VIETNAM EDUCATION FOUNDATION (VEF)

## List of VEF Alliance Schools as of November 2009 (107)

| #  | University  | Division/Department  |
|----|---|--|
| 39 | Purdue University                                       | Graduate School  |
| 40 | Rensselaer Polytechnic Institute                        | Graduate School  |
| 41 | Rice University   | Graduate School  |
| 42 | Rutgers University                                      | Graduate School  |
| 43 | Southern Illinois University Carbondale                 | Graduate School  |
| 44 | State University of New York at Binghamton              | Graduate School  |
| 45 | Stony Brook University                                  | Graduate School  |
| 46 | Syracuse University                                     | Graduate School  |
| 47 | Temple University                                       | Graduate School  |
| 48 | Texas A&M University                                    | Graduate School  |
| 49 | Texas Tech University                                   | Graduate School  |
| 50 | Tulane University                                       | Graduate School  |
| 51 | University at Buffalo, the State University of New York | School of Engineering & Applied Sciences   |
| 52 | University of Alabama at Birmingham                     | Graduate School  |
| 53 | University of Arkansas, Fayetteville                    | Graduate School  |
| 54 | University of California at Berkeley                    | Chemical Engineering; Chemistry; Comparative Biochemistry; Environmental Science, Policy, & Management; Epidemiology; Logic & the Methodology; Mathematics; Molecular & Biochemical Nutrition; Neuroscience; Nutritional Sciences & Toxicology; Physics; Plant & Microbial Biology; Vision Science; All College of Engineering Departments |
| 55 | University of California at Davis                       | Graduate School  |
| 56 | University of California at Irvine                      | Graduate School  |
| 57 | University of California at Los Angeles                 | School of Engineering & Applied Science  |
| 58 | University of California at Riverside                   | Graduate School  |
| 59 | University of California at San Diego                   | Graduate School  |
| 60 | University of California at San Francisco               | Graduate Division  |
| 61 | University of California at Santa Barbara               | Graduate School  |
| 62 | University of Cincinnati                                | Graduate School  |
| 63 | University of Colorado at Boulder                       | Graduate School  |
| 64 | University of Colorado at Denver Health Science Center  | Graduate School  |
| 65 | University of Connecticut                               | Graduate School  |
| 66 | University of Delaware                                  | Graduate School  |
| 67 | University of Florida                                   | School of Engineering  |
| 68 | University of Georgia                                   | Graduate School  |
| 69 | University of Hawaii at Manoa                           | Graduate School  |
| 70 | University of Houston                                   | Graduate School  |
| 71 | University of Idaho                                     | Graduate School  |
| 72 | University of Illinois at Urbana - Champaign            | Graduate College   |
| 73 | University of Iowa                                      | Graduate School  |
| 74 | University of Kansas                                    | Graduate School  |

# VIETNAM EDUCATION FOUNDATION (VEF)

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## List of VEF Alliance Schools as of November 2009 (107)

| #   | University  | Division/Department   |
|-----|---|---|
| 75  | University of Kentucky  | Graduate School   |
| 76  | University of Louisville                                      | Graduate School   |
| 77  | University of Maine   | Graduate School   |
| 78  | University of Maryland, Baltimore County                      | Graduate School   |
| 79  | University of Massachusetts Amherst                           | Graduate School   |
| 80  | University of Michigan at Ann Arbor                           | College of Engineering (doctoral programs only)   |
| 81  | University of Minnesota                                       | Institute of Technology   |
| 82  | University of Missouri - Columbia                             | Graduate School   |
| 83  | University of Nebraska - Lincoln                              | Graduate School   |
| 84  | University of North Carolina at Chapel Hill                   | Graduate School   |
| 85  | University of North Carolina at Charlotte                     | Graduate School   |
| 86  | University of North Texas                                     | Graduate School   |
| 87  | University of North Texas Health Science Center at Fort Worth | Graduate School   |
| 88  | University of Notre Dame                                      | Graduate School   |
| 89  | University of Oklahoma  | Graduate School   |
| 90  | University of Oregon  | Graduate School   |
| 91  | University of Pennsylvania                                    | School of Arts and Sciences; School of Nursing  |
| 92  | University of Rhode Island                                    | Graduate School   |
| 93  | University of Southern California                             | (1) College of Letters, Arts & Science; (2) Viterbi School of Engineering   |
| 94  | University of Texas at Arlington                              | Graduate School   |
| 95  | University of Texas at Austin                                 | Graduate School   |
| 96  | University of Texas at Houston                                | Graduate School of Biomedical Sciences; School of Public Health   |
| 97  | University of Toledo  | Graduate School   |
| 98  | University of Utah  | Graduate School   |
| 99  | University of Vermont   | Graduate School   |
| 100 | University of Virginia  | Graduate School   |
| 101 | University of Washington                                      | Environmental and Occupational Health; Materials Science and Engineering; Interdisciplinary Program in Pathobiology |
| 102 | University of Wyoming   | Graduate School   |
| 103 | Virginia Commonwealth University                              | Graduate School   |
| 104 | Virginia Polytechnic Institute and State University           | Graduate School   |
| 105 | Washington State University                                   | Graduate School   |
| 106 | Washington University in St. Louis                            | Graduate School   |
| 107 | Yale University   | Graduate School (doctoral programs only)  |

# VIETNAM EDUCATION FOUNDATION (VEF)

## History of VEF Annual Conferences

|     | DATES                  | TITLE  | LOCATION   |
|-----|------------------------|--|--|
| 1st | Fall 2003              | Gathering of Fellows: 2003 cohort  | Washington, D.C.   |
| 2nd | December 17 - 21, 2004 | Vietnam Education Foundation Fellows' Conference   | Washington, D.C. : National Academy of Sciences.<br><br>Conference Hotel: State Plaza Hotel  |
| 3rd | December 27 - 30, 2005 | Vietnam Education Foundation Fellows' Conference   | Irvine, CA: National Academies' Beckman Center Conference<br><br>Hotel: Hyatt Regency Newport Beach  |
| 4th | December 27 - 30, 2006 | Vietnam Education Foundation Fellows' Conference   | Houston, TX: University of Texas at Houston, Graduate School of Biomedical Sciences<br><br>Conference Hotel: Houston Marriott Medical Center |
| 5th | January 3 - 6, 2008    | Annual Conference of Fellows of the Vietnam Education Foundation<br><br>THEME:<br>All the Ways Home                | Irvine, CA: National Academies' Beckman Center<br><br>Conference Hotel: Hyatt Regency Newport Beach  |
| 6th | January 4 - 5, 2009    | Vietnam Education Foundation Fellows and Scholars Conference<br><br>THEME:<br>All the Ways Home                    | Washington, D.C. : National Academy of Sciences<br><br>Conference Hotel: Hyatt Regency   |
| 7th | January 3 - 5, 2010    | Vietnam Education Foundation Fellows and Scholars Conference<br><br>THEME:<br>Leaders of the Future: Entrepreneurs | Troy, NY: Rensselaer Polytechnic Institute<br><br>Conference Hotel: The Desmond Hotel  |

# 7TH ANNUAL VEF FELLOWS AND SCHOLARS CONFERENCE

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## Planning Committee

1. **VEF Staff:** U.S. and Hanoi Staff (Names are provided earlier in this booklet)

2. **VEFFA (VEF Fellows and Scholars Association) Members:**

**All the Ways Home**

Dat T. Nguyen, Chair; Tuong M. Nguyen, Duy Q. Vu

**Gala Dinner**

Quang T. N. Nguyen, Chair; Anh H. Le, Thanh-An Nguyen Le, Anh H. Tran

**General Committee**

Dung T. Hong, Chair; Ha T. Nguyen, Cam Van T. Vo

**Leadership Training Workshop**

Liem M. Phan, Chair; Anh P. Nguyen

**Networking**

Anh P. Nguyen, Chair; Anh M. Nguyen, Tu N. Pham

**Recreational Activities**

Kien T. Doan, Chair

**Scientific Sessions**

Loc X. Bui, Chair; Trung D.C. Cao, Ha X. Dang, Nhan T. Ho, Trung Q. Le, Binh Nguyen, Khoi T. Nguyen, Kien C. Nguyen, Nguyen H. P. Nguyen, Thuy H. Nguyen, Trang Nguyen, Liem M. Phan, Duan D. Tran, Phong A. Tran

3. **Rensselaer Polytechnic Institute (RPI)**

**The Graduate School**

Stanley M. Dunn, Vice Provost & Dean of the Graduate School  
Connie Grega, Assistant Director for Academic Outreach Programs  
Mike Gunther, Program Manager for Recruitment  
Mecaila Smith, Program Coordinator

Dennis E. Gornic, Associate Dean  
Kari Bennett, Senior Program Administrator for Summer Programs  
Celia Paquette, Senior Student Services Administrator  
Ronnie Rowe, Senior Student Services Administrator  
Trina Beaudoin, Administrative Assistant  
Kate Norman, Administrative Associate  
Ajuba Jones, Assistant III

**Strategic Communications and External Relations**

Jill Kaiser, Communications Specialist  
Tracey Leibach, Managing Editor

**Provost's Office**

Francine Fredette, Business Manager

## INVITED SESSION ABSTRACTS

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Tuesday, January 5 1:30 pm - 2:30 pm

**Anna Dyson**, Associate Professor

Director, Center for Architecture Science and Ecology

**“Next Generation Environmental and Energy Systems for Buildings”**

Session Chair: Loc X. Bui

**Dr. Kim Fortun**, Associate Professor

Science and Technology Studies

**“Historical and Cultural Perspective on Environmental Informatics”**

Session Chair: Thuy T.H. Nguyen

**Dr. Shekhar S. Garde**, Elaine and Jack S. Parker Chaired Professor and Department Head,

Chemical and Biological Engineering

**“Adventures of a Chemical Engineer into the Land of Molecules: From Carbon Nanotubes and Proteins to Moviemaking”**

Session Chair: Huong T.N. Le

**Dr. Robert J. Linhardt**, Constellation Chair/Professor

Chemistry and Chemical Biology, Chemical and Biological Engineering, and Biology

**“Heparin and Heparan Sulfate: New Approaches in Glycoengineering”**

Session Chair: Trung D.C. Cao

**Dr. George I. Makhatadze**, Professor of Biology, Chemistry and Chemical Biology

Chaired Constellation Professor in Biocomputation and Bioinformatics

**“Computational Design of Thermostable Enzymes for Use in Biotechnology and Medicine”**

Session Chair: Liem M. Phan

## INVITED SESSION ABSTRACTS

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### **Next Generation Environmental and Energy Systems for Buildings**

Anna Dyson

Director, Center for Architecture Science and Ecology

*Rensselaer Polytechnic Institute*

The Center for Architecture, Science & Ecology (CASE) is an innovative collaboration between Rensselaer Polytechnic Institute and multiple industrial partners, including Skidmore Owings and Merrill (SOM), that integrates scientists, engineers, and architects from the professional and academic worlds toward a common goal of redefining how we build sustainable cities and environments. The Built Ecologies advanced graduate degree program at CASE is designed to develop knowledge and expertise in the development of paradigm shifting new buildings systems, structures, and environments that are informed by the behavior of natural systems and/or performance characteristics of emerging technologies. The aim is to develop performance driven design techniques and solutions to building systems based on an understanding that the built world can and should contribute synergistically to the health of larger ecologies in support of biodiversity. CASE is addressing the need for accelerated innovation of radically new sustainable built environments through the development of next-generation building systems.

### **Historical and Cultural Perspective on Environmental Informatics**

Kim Fortun, Associate Professor

Department of Science and Technology Studies

*Rensselaer Polytechnic Institute*

The development of information technology, infrastructure and modeling capacity since the 1980s has had a dramatic impact on environmental science and politics. In this presentation, I will describe and analyze key developments in the United States, drawing on oral history interviews with people working in academic and government laboratories, in policy arenas, and in both grassroots and international environmental activist organizations. My overarching argument is that the environmental field is one site of a significant historical shift in the way knowledge is produced and used, largely driven by informatics. Informatics enable linkage between different type of data, comparative perspective and movement from observation to prediction. Informatics also enable understanding of non-linear phenomena, and cumulative effects. In the environmental field, this has allowed people to advance insight and set priorities despite the complexity of environmental problems, and the notorious challenge of establishing causation. My argument builds on work in the history of science focused on ways scientific concepts and methodologies evolve, affecting scientific practice, how science is used in practical affairs, and ideas about what makes knowledge robust, credible and operational.

### **Adventures of a Chemical Engineer into the Land of Molecules: From Carbon Nanotubes and Proteins to Moviemaking**

Shekhar Garde, Elaine and Jack S. Parker Chaired Professor and Department Head

*Rensselaer Polytechnic Institute*

Beginning of the 21st century feels like the time for small things, for atoms and molecules. Indeed, the most powerful motivator for modern scientists and engineers appears to be that if we can understand and manipulate matter at the smallest level, we can engineer or design novel and superior properties at the macroscale. Computer modeling and simulations are playing an increasingly important role in our understanding of materials at the smallest levels. I will describe some of the exciting recent advances in our understanding of bio and nanosystems using computational approaches. In fact, it turns out that the behavior of matter at the nanoscale can be quite different from that at macroscale. I will demonstrate this by showing examples of water flow through carbon nanotubes, of behavior of enzymes in non-biological contexts, and by describing a new method to paint protein surfaces using nanoscale paintbrushes! Availability of structural and dynamic data on the molecular world has also allowed us to explore Moviemaking Hollywood style. I will briefly describe our recent development of making of an IMAX movie titled "Molecules to the MAX."

### **Heparin and Heparan Sulfate: New Approaches in Glycoengineering**

Robert J. Linhardt, Constellation Chair/Professor  
Chemistry and Chemical Biology, Chemical and Biological Engineering, and Biology  
*Rensselaer Polytechnic Institute*

Heparin, a prominent clinical anticoagulant, is the most widely used carbohydrate-based therapeutic. Pharmaceutical heparin is a natural product prepared from animal tissues. The heparin contamination crisis in 2008, led us to examine opportunities to utilize biotechnology to prepare heparin and heparin oligosaccharides for therapeutic applications. In undertaking this project it became clear that we lacked a full understanding of heparin biosynthesis, particularly the control of the placement of structural domains within the heparin polysaccharide. We have initiated an artificial Golgi project, utilizing both microfluidic and microarray platforms, to serve as a test bed to develop a means to control heparin biosynthesis. This technology also has applications for the study of structural and functional glycomics of heparin and the related, heparan sulfate, particularly in to stem cell differentiation.

# SCIENTIFIC SESSION ABSTRACTS

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Sunday, January 3 2:45 pm - 6:00 pm

## ELECTRICAL ENGINEERING

Session Chair: Kien C. Nguyen

## COMPUTER SCIENCE

Session Chair: Binh Nguyen

## PUBLIC HEALTH AND BIOMEDICAL SCIENCE

Session Chair: Nhan T. Ho

## CHEMICAL, BIOLOGICAL and AGRICULTURAL SCIENCE

Session Chairs: Liem M. Pham and Trung D.C. Cao

## ENVIRONMENTAL, EARTH, ATMOSPHERIC, AND NATURAL RESOURCE SCIENCE

Session Chair: Thuy T.H. Nguyen

## CIVIL, INDUSTRIAL, MECHANICAL, AND AEROSPACE ENGINEERING

Session Chairs: Trung Q. Le, Trang Nguyen, Nguyen H.P. Nguyen

## MATHEMATICS AND PHYSICS

Session Chair: Phong A. Tran

## Oral Presentations

- 2:45 pm – 3:10 pm      **Dzung Nguyen**  
“Solar Industry Trends”
- 3:10 pm – 3:35 pm      **Kien Nguyen, Tansu Alpcan and Tamer Basar**  
“Security Games with Decision and Observation Errors”
- 3:35 pm – 4:00 pm      **Dung T. Vo and Truong Q. Nguyen**  
“Optimal Motion Compensated Spatio-Temporal Filter For Quality Enhancement of H.264/AVC Compressed Video Sequences”
- 4:00 pm – 4:15 pm      **Break/Poster Presentation**
- 4:15 pm – 4:40 pm      **Thang Nguyen, Wu-Chung Su, and Zoran Gajic**  
“Singular Perturbation Analysis of Discrete-Time Output Feedback Sliding Mode Control with Disturbance Attenuation”
- 4:40 pm – 5:05 pm      **Loc Bui, R Srikant, and Alexander Stolyar**  
“A Novel Architecture for Delay Reduction in Back-Pressure Scheduling Algorithm”
- 5:05 pm – 5:30 pm      **Phong Nguyen, Henry Pfister and Krishna Narayanan**  
“A Rate-Distortion Perspective on Multiple Decoding Attempts for Reed-Solomon Codes”

## Poster Presentation

1. **Hyungkyu Kwon**  
“Problem-based EEG Neurofeedback Simulation Training Model Development”

### Solar Industry Trends

Dzung Nguyen

*North Eastern University*

This presentation focuses on the development trend of the solar energy market. It also briefly describes the solar PV cells production process, the technology, the price and the possibility of building the small solar PV factory in Vietnam.

Keywords: Solar PV technology

### Security Games with Decision and Observation Errors

Kien Nguyen<sup>1</sup>, Tansu Alpcan<sup>2</sup>, and Tamer Basar<sup>1</sup>

1. *University of Illinois at Urbana-Champaign*

2. *Deutsche Telekom Laboratories*

We study two-player security games which can be viewed as sequences of nonzero-sum matrix games played by an Attacker and a Defender. The evolution of the game is based on a stochastic fictitious play process. Players do not have access to each other's payoff matrix. Each has to observe the other's actions up to present and plays the action generated based on the best response to these observations. However, when the game is played over a communication network, there are several practical issues that need to be taken into account: First, the players may make random decision errors from time to time. Second, the players' observations of each other's previous actions may be incorrect. The players will try to compensate for these errors based on the information they have. We examine convergence property of the game in such scenarios, and establish convergence to the equilibrium point under some mild assumptions when both players are restricted to two actions.

Keywords: network security, game theory, fictitious play, learning, stability

### Optimal Motion Compensated Spatio-Temporal Filter For Quality Enhancement of H.264/AVC Compressed Video Sequences

Dung T. Vo and Truong Q. Nguyen

*University of California at San Diego*

The paper proposes a novel algorithm to enhance the quality of H.264/AVC compressed video sequences by using an inloop spatio-temporal motion compensated filter (MCSTF). Extra information from surrounding coded frames is used together with the information of the current coded frame to reduce the coding artifacts. With the availability of the original frame, the MCSTF coefficients are optimized at the encoder and then are implemented at the decoder. Furthermore, an overlapped motion compensated scheme is proposed to reduce the blocking artifacts from surrounding motion compensated frames. Simulation results are judged by PSNR and flickering metric.

Keywords: quality enhancement, H.264/AVC compressed sequences, spatio-temporal filtering, coding artifacts.

### Singular Perturbation Analysis of Discrete-Time Output Feedback Sliding Mode Control with Disturbance Attenuation

Thang Nguyen<sup>1</sup>, Wu-Chung Su<sup>2</sup>, and Zoran Gajic<sup>1</sup>

1. Rutgers University

2. National Chung-Hsing University

We address the output feedback sliding mode control problem for a sampled data linear system with disturbances. By taking into account the disturbance compensation, a deadbeat high gain output feedback control strategy with additional dynamics is able to attenuate the disturbances. It is shown that the closed loop system exhibits both singularly perturbed and weakly coupled characteristics. A numerical example of an aircraft attitude output feedback control is provided to demonstrate the effectiveness of the proposed approach.

Keywords: sliding mode control, sampled-data systems, output feedback control, singular perturbation

### A Novel Architecture for Delay Reduction in Back-Pressure Scheduling Algorithm

Loc Bui<sup>1</sup>, R. Srikant<sup>2</sup>, and Alexander Stolyar<sup>3</sup>

1. Airvana Inc.

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3. Bell Labs, Alcatel-Lucent

The back-pressure algorithm is a well-known throughput-optimal algorithm. However, its implementation requires that each node has to maintain a separate queue for each commodity in the network, and only one queue is served at a time. This fact may lead to a poor delay performance even when the traffic load is not close to network capacity. Also, since the number of commodities in the network is usually very large, the queuing data structure has to be maintained at each node is respectively complex. In this paper, we present a solution to address both of the above issues. In particular, our proposed architecture allows each node to maintain only per-neighbor queues, and moreover, improves the delay performance of the back-pressure algorithm.

Keywords: scheduling, back-pressure algorithm, delay performance

### A Rate-Distortion Perspective on Multiple Decoding Attempts for Reed-Solomon Codes

Phong Nguyen, Henry Pfister, and Krishna Narayanan

Texas A&M University

Recently, a number of authors have proposed decoding schemes for Reed-Solomon (RS) codes based on multiple trials of a simple RS decoding algorithm. In this paper, we present a rate-distortion (R-D) approach to analyze these multiple-decoding algorithms for RS codes. This approach is first used to understand the asymptotic performance-versus-complexity trade-off of multiple error-and-erasure decoding of RS codes. By defining an appropriate distortion measure between an error pattern and an erasure pattern, the condition for a single error-and-erasure decoding to succeed reduces to a form where the distortion is compared to a fixed threshold. Finding the best set of erasure patterns for multiple decoding trials then turns out to be a covering problem which can be solved asymptotically by rate-distortion theory. Next, this approach is extended to analyze multiple algebraic soft-decision (ASD) decoding of RS codes. Both analytical and numerical computations of the R-D functions for the corresponding distortion measures are discussed. Simulation results show that proposed algorithms using this approach perform better than other algorithms with the same complexity.

Keywords: Reed-Solomon codes, soft decision, ASD, error-and-erasure, multiple decoding attempts

### **Problem-based EEG Neurofeedback Simulation Training Model Development**

Hyungkyu Kwon

*Kyungshung University*

This study developed the electroencephalography(EEG) training model by analyzing the differences between the problem-based learning steps and brain hemispheric lateralization variables to generate computer simulation training. This study constructs the effective problem-based training through the EEG neurofeedback by applying PBL (problem-based learning) by the functional characteristics of the brain function. It was discovered that the optimal brainwave control is possible by the problem-based neurofeedback training.

This research proposed a set of systematic procedures for the EEG neurofeedback for the patient treatment applying problem-based simulation training. This simulation training involves the situation where the trainer applies neurofeedback modalities towards the satisfactory treatment of the patient. In this model, the problem-based training procedures for the patient adaptation to the treatment are mainly considered. This model consists of 8 phases: the problem establishment, the eeg based examination of symptoms, the problem-based examination of patients, the integrated interaction for the treatment, the clarification of the problem, the treatment procedure establishment, the verification of the mutual role, the training evaluation for the next treatment. It helps patients to enhance self-directed regulation for better treatment.

Keywords: EEG neurofeedback, simulation, problem based training, brainwave, self directed regulation

## Oral Presentations

- 2:45 pm – 3:10 pm      **Tung Nguyen, Hoan Nguyen, Nam Pham, Jafar Al-Kofahi, and Tien Nguyen**  
*“Graph-based Mining of Multiple Object Usage Patterns”*
- 3:10 pm – 3:35 pm      **Cuong Tran and Mohan Trivedi**  
*“Introducing ‘XMOB’: Extremity Movement Observation Framework for Upper Body Pose Tracking in 3D”*
- 3:35 pm – 4:00 pm      **Thang Dinh**  
*“Real Time Tracking using an Active Pan-Tilt-Zoom Network Camera”*
- 4:00 pm – 4:15 pm      **Break/Poster Presentations**
- 4:15 pm – 4:40 pm      **Tuyen Huynh and Raymond Mooney**  
*“Max-Margin Weight Learning for Markov Logic Networks”*
- 4:40 pm – 5:05 pm      **Anh Nguyen, Nabil Schear, HeeDong Jung, Apeksha Godiyal, Samuel King, and Hai Nguyen**  
*“MAVMM: Lightweight and Purpose Built VMM for Malware Analysis”*
- 5:05 pm – 5:30 pm      **Conclusion and announcement of VEF SS CS track’s “Best presentation”**

### **Graph-based Mining of Multiple Object Usage Patterns**

Tung Nguyen, Hoan Nguyen, Nam Pham, Jafar Al-Kofahi and Tien Nguyen

*Iowa State University*

The interplay of multiple objects in object-oriented programming often follows specific protocols, for example certain orders of method calls and/or control structure constraints among them that are parts of the intended object usages. Unfortunately, the information is not always documented. That creates long learning curve, and importantly, leads to subtle problems due to the misuse of objects. In this paper, we propose GrouMiner, a novel graph-based approach for mining the usage patterns of one or multiple objects. GrouMiner approach includes a graph-based representation for multiple object usages, a pattern mining algorithm, and an anomaly detection technique that are efficient, accurate, and resilient to software changes. Our experiments on several real-world programs show that our prototype is able to find useful usage patterns with multiple objects and control structures, and to translate them into user-friendly code skeletons to assist developers in programming. It could also detect the usage anomalies that caused yet undiscovered defects and code smells in those programs.

Keywords: graph-based mining, usage pattern, object usage

### **Introducing “XMOB”: Extremity Movement Observation Framework for Upper Body Pose Tracking in 3-D**

Cuong Tran and Mohan Trivedi

*University of California at San Diego*

Human pose tracking is an important and challenging computer vision task. The difficulty comes from the very high dimensional space of possible human poses, self occlusion, variances in human appearance, and lighting conditions. In this paper, we propose a novel upper body pose tracking approach that first tracks the 3-D movements of extremities, including head and hands. Then based on the knowledge of upper body model, these extremity movements are used to predict the whole upper body motion as an inverse kinematics problem. By doing so, the complexity is reduced by breaking the problem of high dimensional search for upper body pose into two sub-problems. Moreover extremities are also the easiest parts to track with less occlusion. Two main contributions are: (i) we introduce a robust head and hands tracking system based on a semi-supervised procedure that segment skin color of a particular user from background colors of a particular scene; and (ii) a numerical method for predicting the whole upper body motion from extremity movements.

Our experimental validation with indoor and in vehicle environments showed good pose tracking results with realtime performance, which indicate the promise of applying this approach in several realistic smart environments and HCI applications, e.g. user activity analysis in driving scene, meeting room, teleconference scene.

Keywords: upper body motion tracking, upper body pose estimation, arm inverse kinematics, head and hands tracking

### **Real Time Tracking using an Active Pan-Tilt-Zoom Network Camera**

Thang Dinh

*University of Southern California*

We present here a real time active vision system on a PTZ network camera to track an object of interest. We address two critical issues in this paper. One is the control of the camera through network communication to follow a selected object. The other is to track an arbitrary type of object in real time under conditions of pose, viewpoint and illumination changes. We analyze the difficulties in the control through the network and propose a practical solution for tracking using a PTZ network camera. Moreover, we propose a robust real time tracking approach, which enhances the effectiveness by using complementary features under a two-

stage particle filtering framework and a multi-scale mechanism. To improve time performance, the tracking algorithm is implemented as a multi-threaded process in OpenMP. Comparative experiments with state-of-the-art methods demonstrate the efficiency and robustness of our system in various applications such as pedestrian tracking, face tracking, and vehicle tracking.

Keywords: computer vision, object tracking, visual tracking, pan-tilt-zoom, camera surveillance

### **Max-Margin Weight Learning for Markov Logic Networks**

Tuyen Huynh and Raymond Mooney

*The University of Texas at Austin*

Markov logic networks (MLNs) are an expressive representation for statistical relational learning that generalizes both first-order logic and graphical models. Existing discriminative weight learning methods for MLNs all try to learn weights that optimize the Conditional Log Likelihood (CLL) of the training examples. In this work, we present a new discriminative weight learning method for MLNs based on a max-margin framework. This results in a new model, Max-Margin Markov Logic Networks (M3LNs), which combines the expressiveness of MLNs with the predictive accuracy of structural Support Vector Machines (SVMs). To train the proposed model, we design a new approximation algorithm for loss-augmented inference in MLNs based on Linear Programming (LP). The experimental result shows that the proposed approach generally achieves higher F1 scores than the current best discriminative weight learner for MLNs.

Keywords: statistical relational learning, Markov logic networks

### **MAVMM: Lightweight and Purpose Built VMM for Malware Analysis**

Anh Nguyen<sup>1</sup>, Nabil Schear<sup>1</sup>, HeeDong Jung<sup>1</sup>, Apeksha Godiyal<sup>1</sup>, Samuel King<sup>1</sup> and Hai Nguyen<sup>2</sup>

1. *University of Illinois at Urbana-Champaign*

2. *Hanoi University of Technology*

Malicious software is rampant on the Internet and costs billions of dollars each year. Safe and thorough analysis of malware is key to protecting vulnerable systems and cleaning those that have already been infected. Most current state-of-the-art analysis platforms run alongside the malware, increasing their detectability. This reduces the value of analysis because some malware is known to behave differently when being analyzed. Virtualization offers a compelling platform for malware analysis, with strong isolation and the ability to save and restore guest state. Current virtual machine monitors (VMMs), however, are not designed for malware analysis. Due to their complexity, they often fail to provide transparency and even expose vulnerabilities that could be exploited by the malware running inside guest system.

We propose a lightweight VMM (namely MAVMM) that is designed specially for a single job: malware analysis. MAVMM does not implement unnecessary virtualization features commonly found in general purpose hypervisors, including virtual device emulation. We take advantage of hardware virtualization support to make MAVMM more simple, secure and transparent. In this paper, we describe the design and implementation of MAVMM, and the features that we can extract from programs running inside the guest OS. We evaluate our platform in three aspects: functionality, detectability and performance. We show that our system can extract useful information from malicious software, and that it is not susceptible to known virtualization detection techniques.

Keywords: malware analysis, virtual machine monitor, security

# PUBLIC HEALTH AND BIOMEDICAL SCIENCE

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Session Chair: Nhan T. Ho

## Oral Presentations

- 2:45 pm – 3:15 pm      **Pascal Kingah, Hung Luu, and Kelly Volcik**  
*“Association of NOS3 Glu298Asp SNP with hypertension and possible effect modification of dietary fat intake in the ARIC study”*
- 3:15 pm – 3:45 pm      **Vinh Q. Bui, Aryeh D. Stein, Ann M. DiGirolamo, Usha Ramakrishnan, Rafael C. Flores-Ayala, Manuel Ramirez-Zea, and Salvador Villapaldo**  
*“Relationships of High CRP and Prevalences of Low Serum Zinc, Ferritin, and Copper Status in Healthy 6-11 Year School Children in Guatemala”*
- 3:45 pm – 4:15 pm      **Bon Trinh and Honami Naora**  
*“Role of DLX4 Homeobox Gene in TGF $\beta$ -mediated Growth Inhibition”*
- 4:15 pm – 4:30 pm      **Break/Poster Presentations**
- 4:30 pm – 5:00 pm      **Quoc C. Nguyen, Victor J. Schoenbach, Phuong L. Huynh, Binh Q. Le, and Thuy T. N. Le**  
*“High HIV risk behaviors of Vietnamese Men Who Have Sex with Men: Results of a national online survey”*
- 5:00 pm – 5:30 pm      **Trung Le, Iman Borazjani, and Fotis Sotiropoulos**  
*“Fluid Structure Interaction Simulation of Heart Prosthesis in Patient-specific Left-Ventricle/Aorta Anatomies”*

## Poster Presentations

1. **Hung Luu, Michael Scheurer, and Karen Adler-Storthz**  
*“Comparison of the Performance of Hybrid Capture II and Polymerase Chain Reaction for HPV Detection in the Screening and Diagnostic Settings”*
2. **Pascal Kingah, Hung Luu, and Kelly Volcik**  
*“Association of NOS3 Glu298Asp SNP with Hypertension and Possible Effect Modification of Dietary Fat Intake in the ARIC Study”*

### Association of NOS3 Glu298Asp SNP with Hypertension and Possible Effect Modification of Dietary Fat Intake in the ARIC Study

Pascal Kingah<sup>1</sup>, Hung Luu<sup>2</sup>, and Kelly Volcik<sup>2</sup>

1. Oakwood Hospital and Medical Center

2. University of Texas Health Science Center at Houston

**Background:** Endothelial nitric oxide synthase (eNOS) breaks down nitric oxide and has a key role in blood pressure regulation. The gene coding for eNOS is polymorphic, and previous studies have shown associations between single nucleotide polymorphisms (SNPs) in the NOS3 gene and hypertension. Studies also suggest that such associations may vary by dietary fat intake.

**Objectives:** We investigated associations between the NOS3 Glu298Asp SNP (rs1799983) and hypertension, as well as the interaction between NOS3 genotypes and dietary fat intake using data from baseline exam in white and African American participants in the Atherosclerosis Risk in the Community (ARIC) study.

**Methods and Results:** Dietary fat intake was measured by a food frequency questionnaire (FFQ) during baseline exam in 15,792 individuals aged 45 to 64 years in the ARIC study participants. Using cross-sectional analysis race-stratified unconditional logistic regression was performed to investigate the association between hypertension and NOS3 Glu298Asp genotypes. There was a significantly higher proportion of African American hypertensives (56%) compared to white hypertensives (27%), but the NOS3 Glu298Asp variant was not significantly associated with hypertension in whites or African Americans ( $p = 0.8$  and  $0.5$ , respectively). There was no significant interaction between dietary fat intake and NOS3 Glu298Asp genotype with regards to hypertension status in either African Americans or whites ( $P$  for interaction =  $0.3$  and  $0.4$ , respectively).

**Conclusions:** We did not find an association between NOS3 Glu298Asp SNP and hypertension, and dietary fat intake did not interact with NOS3 genotypes to influence hypertension.

Keywords: hypertension, ARIC, NOS3 Glu298Asp SNP, dietary fat intake

### Relationships of High CRP and Prevalences of Low Serum Zinc, Ferritin, and Copper Status in Healthy 6-11 Year School Children in Guatemala

Vinh Q. Bui<sup>1</sup>, Aryeh D. Stein<sup>1</sup>, Ann M. DiGirolamo<sup>1</sup>, Usha Ramakrishnan<sup>1</sup>, Rafael C. Flores-Ayala<sup>1</sup>, Manuel Ramirez-Zea<sup>2</sup>, and Salvador Villalpado<sup>3</sup>

1. Emory University

2. Institute of Nutrition of Central America & Panama (INCAP)

3. National Institute of Public Health of Mexico

**Background:** We aimed to assess the community prevalences of low serum zinc, ferritin, and copper in high and low subgroups defined by various CRP cutoffs.

**Method:** 720 healthy 6-11 year school children were recruited in a semi-urban region of Guatemala. Outcomes were baseline serum zinc, ferritin, and copper prevalences. Serum CRP levels were classified in to 6 subgroups: 0 to 0.5, >0.5 to 1, >1 to 3, >3 to 5, >5 to 10, and >10 mg/L.

**Results:** At the baseline, 44.8% subjects had serum CRP 0.5 mg/L, 20.7% had CRP from 0.5 to 1 mg/L, and only 2.4% had serum CRP > 10 mg/L. Prevalences of low serum zinc, ferritin, and copper were 21.7%, 2.3%, and 23.8%, respectively, in all subjects; 23%, 3.2%, and 28.7% in subjects with CRP  $\leq 1$  mg/L. Serum CRP was not correlated to serum zinc ( $p = 0.34$ ), but significant correlated to serum ferritin and copper (each  $p < 0.0001$ ). Risk of low zinc status by high vs. low CRP subgroups was not changed by CRP cutoffs (all  $p > 0.05$ ). Inversely, the risks of low serum ferritin and copper for subjects with CRP > 1 mg/L vs.  $\leq 1$  mg/L were significantly reduced by 87% (adjusted OR 0.13, 95% CI 0.02, 0.97) and 61% (adjusted OR 0.39, 95% CI 0.25, 0.61), respectively.

## Oral Presentations

**Conclusion:** In healthy children, prevalence of low serum zinc was the same in high and low CRP subgroups; prevalences of low serum ferritin and copper were significantly reduced in subgroups with CRP > 1mg/L.

Keywords: CRP, zinc, ferritin, copper, prevalence

## Role of DLX4 Homeobox Gene in TGF- $\beta$ -mediated Growth Inhibition

Bon Trinh and Honami Naora

*M. D. Anderson Cancer Center, University of Texas*

Transforming growth factor- $\beta$  (TGF- $\beta$ ) is a secreted factor that inhibits growth of normal cells. However, many tumors are resistant to the growth-inhibitory effect of TGF- $\beta$ . In some types of tumors (e.g. colon and pancreatic cancers), resistance to TGF- $\beta$  is caused by mutations in genes that encode membrane receptors for TGF- $\beta$  and Smad proteins that transfer the signal from TGF- $\beta$  receptors to the nucleus. However, these mutations rarely occur in many other types of tumors such as prostate and lung cancers. The resistance of these tumors to TGF- $\beta$  is therefore likely caused by other molecular abnormalities. These molecular abnormalities represent candidate targets for therapy and diagnostic markers, and therefore their identification has high clinical application.

This study focuses on DLX4, a nuclear protein that normally controls embryonic development. Our laboratory and others have reported that DLX4 is abnormally expressed in many types of tumors, including prostate and lung cancers. My hypothesis is that DLX4 promotes tumor growth by blocking the growth-inhibitory effect of TGF- $\beta$ .

The aims of our study are to determine whether and how DLX4 blocks the growth-inhibitory effect of TGF- $\beta$ . Our results demonstrate that DLX4 inhibits TGF- $\beta$ -mediated growth-inhibition by interfering with Smad activity. Our ongoing studies will further determine the mechanism by which DLX4 blocks Smad signaling.

Our study will provide a molecular explanation as to why many tumors are resistant to the growth-inhibitory effect of TGF- $\beta$  in the absence of mutations in genes encoding TGF- $\beta$  receptors and Smad proteins. DLX4 might therefore represent a candidate target for therapy and a valuable diagnostic tumor marker. At a broader level, our study will provide insights into how abnormal expression of an embryonic developmental gene promotes tumor growth.

Keywords: cancer, tumor growth, homeobox gene

## High HIV risk behaviors of Vietnamese Men Who Have Sex with Men: Results of a national online survey

Quoc C. Nguyen<sup>1</sup>, Victor J. Schoenbach<sup>1</sup>, Phuong L. Huynh<sup>2</sup>, Binh Q. Le<sup>2</sup>, and Thuy T. N. Le<sup>2</sup>

*1. University of North Carolina at Chapel Hill*

*2. Institute for Studies of Society, Economy and Environment*

**Background:** The HIV epidemic is spreading in Viet Nam and Vietnamese Men Who Have Sex with Men (MSM) is recognized as one of most at risk populations. However, little is known about them, including those who frequent gay websites. This study surveyed socio-demographic characteristics and HIV risk behaviors of this population.

**Methods:** A national online survey was conducted from November 2008 to February 2009. Advertisements and links to the study questionnaire were posted on the five most popular Vietnamese gay websites.

**Results:** A total of 1,453 completed, non-duplicated submissions were received. Median age was 23 (range 18 – 50). 81% were enrolled in or had completed a university degree program. The majority of respondents were from metropolitan cities, such as Hochiminh City (66%) and Hanoi Capital (13%). 8% were married to women. 67% self-identified as gay, 18% as bi-sexual, and 4% as straight. Respondents reported a median of 2 male sex partners in the past 6 months. 8% of respondents had sex with both male and female partners. 37%, 54%, 67%, and 51% of respondents reported consistent condom use in anal sex with regular,

casual, paid male partners, and male partners who paid them, respectively. 54% correctly answered all 5 questions about HIV transmission. 41% considered themselves at risk of HIV infection. 31% had ever had a HIV test and knew the result.

Conclusion: Sizable proportions of Vietnamese MSM had unprotected anal sex with male partners. The HIV knowledge and risk self-perception were both low. Further studies and HIV prevention interventions are urgently needed for this population.

Keywords: MSM, HIV, risk behavior, online survey

### **Fluid Structure Interaction Simulation of Heart Prosthesis in Patient-specific Left-Ventricle/Aorta Anatomies**

Trung Le, Iman Borazjani, and Fotis Sotiropoulos

*University of Minnesota*

In order to test and optimize heart valve prosthesis and enable virtual implantation of other biomedical devices it is essential to develop and validate high-resolution FSI-CFD codes for carrying out simulations in patient-specific geometries. We have developed a powerful numerical methodology for carrying out FSI simulations of cardiovascular flows based on the CURVIB approach (Borazjani, L. Ge, and F. Sotiropoulos, *Journal of Computational physics*, vol. 227, pp. 7587-7620 2008). We have extended our FSI method to overset grids to handle efficiently more complicated geometries e.g. simulating an MHV implanted in an anatomically realistic aorta and left-ventricle. A compliant, anatomic left-ventricle is modeled using prescribed motion in one domain. The mechanical heart valve is placed inside the second domain i.e. the body-fitted curvilinear mesh of the anatomic aorta. The simulations of an MHV with a left-ventricle model underscore the importance of inflow conditions and ventricular compliance for such simulations and demonstrate the potential of our method as a powerful tool for patient-specific simulations

Keywords: fluid structure interaction, heart valve, left ventricle

### Comparison of the Performance of Hybrid Capture II and Polymerase Chain Reaction for HPV Detection in the Screening and Diagnostic Settings

Hung Luu<sup>1</sup>, Michael Scheurer<sup>2</sup>, and Karen Adler-Storzhz<sup>1</sup>

1. University of Texas Health Science Center at Houston

2. Baylor College of Medicine

**Background:** Over the past decade, empirical studies on PCR as a “gold-standard” test for HPV diagnostics have shown that, while the test generally exhibits high sensitivity, its low specificity contributes to a high false positive rate. On the other hand, Hybrid Capture has been used as a “ready-to-use” tool for routine clinical diagnostic testing in conjunction with cytological screening. However, a number of comparisons between the performances of Hybrid Capture II (HCII) versus PCR for the identification of cervical dysplasia has provided inconsistent results.

**Objectives:** We evaluated the performance of HCII and PCR in both screening and diagnostic populations and compared the performance of real-time RT-PCR versus traditional PCR followed by Southern blot in a cohort of 1,850 non-pregnant women from three clinical centers in the United States and Canada.

**Methods:** Cervical specimens for detection by HCII (Digene Corporation) were collected and processed according to the manufacturer’s protocol. Cervical specimens for PCR were collected using cytology brushes and placed directly in lysis buffer until extraction using the QIAgen mini-kit (QIAgen). HCII was used to detect positivity to low-risk or high-risk HPV types according to manufacturer’s protocol. Traditional PCR with Southern Blot and RT-PCR were used to detect the presence of high-risk HPV DNA (by consensus or for HPV16 or HPV18 in particular). Sensitivity, specificity, positive predictive value (PVP), negative predictive value (PVN), and concordance of results between tests were used to evaluate the performance of HC II and PCR for the detection of HPV DNA in cervical samples.

**Results:** Specificity of HCII in detecting LGSIL was higher in the screening group (0.90, 95% CI: 0.88-0.93) compared to the diagnostic group (0.68, 95%: 0.62-0.74); however specificity of PCR was low in both the screening (0.35, 95%CI: 0.31-0.39) and diagnostic groups (0.18, 95% CI: 0.13-0.24). There was comparable sensitivity by both tests in both groups to detect HGSIL; however, HCII was more specific (0.90, 95% CI: 0.88-0.93; 0.68; 95%: 0.62-0.74) than PCR (0.35, 95%CI: 0.31-0.39; 0.18, 95% CI: 0.13-0.24) in the screening and diagnostic groups, respectively. Overall agreement for HPV positivity was about 50% between HCII and PCR; with more positive results coming from the PCR. In comparing the two PCR methods, overall agreement was 61% in the screening group, but was 94% in the diagnostic group.

**Conclusions:** Our data show that PCR was more sensitive but less specific than HCII in detecting LGSIL and that HCII was more efficient in detecting HGSIL than PCR in both screening and diagnostic populations. The agreement in detecting HPV positivity between HCII and PCR was low; however, this could be due to more HPV types being included in the consensus PCR primers than in the HCII assay. In addition, agreement between the two PCR methods, while adequate, was higher for the diagnostic group than for the screening group.

Keywords: PCR, HCII, performance, human papillomavirus, cervical cancer

### Association of NOS3 Glu298Asp SNP with Hypertension and Possible Effect Modification of Dietary Fat Intake in the ARIC Study

Pascal Kingah<sup>1</sup>, Hung Luu<sup>2</sup>, and Kelly Volcik<sup>2</sup>

1. Oakwood Hospital and Medical Center

2. University of Texas Health Science Center at Houston

(See page 45 for Abstract)

# CHEMICAL, BIOLOGICAL and AGRICULTURAL SCIENCE

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Session Chairs: Liem M. Pham and Trung D.C. Cao

## Oral Presentations

- 2:45 pm – 3:10 pm      **Phong Huynh and Paul Takhistov**  
*“Phase Separation During Non-Isothermal Cooling of Polymer-Drug Dispersion”*
- 3:10 pm – 3:35 pm      **Ly Le, Eric Lee, Klaus Schulten, and Thanh Truong**  
*“Molecular Modeling of Mutation-induced Tamiflu Drug Resistance for Swine Influenza H1N1pdm and Avian H5N1 Influenza N1 Neuraminidases”*
- 3:35 pm – 4:00 pm      **Van Vu**  
*“Human Deoxyhypusine Hydroxylase, an Enzyme Involved in Regulating Cell Growth, Activates O<sub>2</sub> with a Nonheme Diiron Center”*
- 4:00 pm – 4:15 pm      **Break/Poster Presentation**
- 4:15 pm – 4:40 pm      **Tran Nguyen**  
*“Study of the Soybean Root Hair Phosphoproteome in Response to Inoculation with Bradyrhizobium Japonicum”*
- 4:40 pm – 5:05 pm      **Liem Phan, Guermarie Velazquez-Torres, Ismael Samudio, Kenneth Parreno, Yaling Huang, Tseng Chieh, Thuy Vu, Sai-Ching Yeung, and Mong-Hong Lee**  
*“Targeting Cancer Glycolysis as a New Strategy for Anti-cancer Therapies”*
- 5:05 pm – 5:30 pm      **Salim Charaniya, Huong Le, Keri Mills, Kevin Johnson, George Karypis, and Wei-Shou Hu**  
*“Mining Manufacturing Data for Enhanced Process Characteristics”*

## Poster Presentation

1. **Phong Huynh**  
*“Surface-Induced Phase Separation of O/W Nano-Emulsion”*

## Phase Separation During Non-Isothermal Cooling of Polymer-Drug Dispersion

Phong Huynh and Paul Takhistov

*Rutgers University*

Biopolymer can improve the solubility of the poor-soluble drugs. This work focus on how polyethylene glycol 3350 (PEG3350), a polymer widely applied in drug delivery, combines with Ibuprofen (IBU) by hot melt in region I and region II of a eutectic mixture. The experiments demonstrate that the amorphous IBU separates from PEG and locates at the boundary of PEG crystals for mixture in region I while in region II some amorphous IBU is in the PEG crystal the other concentrate at PEG crystals' boundary. Phase diagram of PEG3350-IBU as well as a model is built to integrate the process of phase separation during solidification. Phase contrast optical microscopy technique is applied to analyze the mechanism of non-isothermal solidification of PEG3350-IBU mixture. It was found that the homogeneous nucleation crystallization occurs in region I mixture crystallization while both homogenous and heterogeneous nucleation crystallization appear in the solidification of mixture in region II. Proposed solution of Stefan-type problem of phase separation due to crystallization process is in good agreement with experimental data.

Keywords: phase separation, drug dispersion, non-isothermal cooling, crystallization

## Molecular Modeling of Mutation-induced Tamiflu Drug Resistance for Swine Influenza H1N1pdm and Avian H5N1 Influenza N1 Neuraminidases

Ly Le<sup>1</sup>, Eric Lee<sup>2</sup>, Klaus Schulten<sup>2</sup> and Thanh Truong<sup>1</sup>

1. *University of Utah*

2. *University of Illinois at Urbana Champaign*

In order to characterize the drug-protein interactions responsible for conferring drug resistance to influenza N1 subtype neuraminidases, molecular modeling and all-atom molecular dynamics simulations were performed on oseltamivir (Tamiflu) bound forms of wild type and known drug resistant mutants (H274Y, N294S) of avian H5N1 and swine H1N1pdm neuraminidases. The simulations shed light on both conserved and unique drug-protein interactions in these two proteins and their oseltamivir-resistant variants. It was observed that swine influenza H1N1pdm and the pathogenic avian H5N1 type-I neuraminidase share highly similar H-bond networks with oseltamivir, suggesting that the same known drug resistant mutations in H5N1 likely also confer drug resistance to H1N1pdm. In the H274Y mutant simulations for both proteins, the mutation was seen to induce increased solvent exposures of oseltamivir's hydrophobic pentyl side group, as well as disrupting a conserved hydrogen bond (seen in wild type and N294S systems) with R152, suggesting a mechanism for drug-resistance. A possible novel mechanism through which the 294 and 274 residue mutations acquire drug resistance was revealed by mapping the mutation site onto an electrostatic pathway which was calculated via a GPU-accelerated multilevel summation method. The observed negatively charge pathway may play a role in controlling drug access to the binding pocket of neuraminidase, establishing a starting point for further investigations of neuraminidase drug resistance.

Keywords: H1N1, influenza, oseltamivir, drug-resistant

## Human Deoxyhypusine Hydroxylase, an Enzyme Involved in Regulating Cell Growth, Activates O<sub>2</sub> with a Nonheme Diiron Center

Van Vu

*University of Minnesota*

Deoxyhypusine hydroxylase (DOHH) is an iron-requiring enzyme that catalyzes the hydroxylation of a deoxyhypusine residue in the final step of the maturation of eukaryotic translation initiation factor 5A (eIF5A). This transformation plays an essential role in the regulation of eukaryotic cell proliferation, making DOHH an attractive target for anti-tumor and anti-HIV therapies. Our

spectroscopic results show that recombinant human DOHH (hDOHH) has a non-heme diiron cluster in its active site. While similar active sites have been found in other O<sub>2</sub>-activating non-heme diiron enzymes, hDOHH represents the first human hydroxylase demonstrated to have such an active site. Thus the diiron motif is a recurring strategy Nature employs to activate O<sub>2</sub> in order to attack strong C-H bonds, even in mammals. Surprisingly, as isolated hDOHH has an unusual blue color that arises from a diiron-O<sub>2</sub> adduct persisting at room temperature for several days. For comparison, O<sub>2</sub> adducts of related diiron enzymes are more reactive and can have lifetimes as short as milliseconds. Nevertheless, isolated hDOHH can in fact carry out the hydroxylation of the deoxyhypusine residue in eIF5A. Understanding why this peroxo species is stable and how it becomes activated will provide significant insight into the oxygen activation mechanisms of the non-heme diiron enzyme family. Further reactivity study and characterization of different forms of hDOHH will be discussed.

Keywords: deoxyhypusine hydroxylase, eIF5A, oxygen activation, diiron(III)-peroxo intermediate, C-H bond functionalization

## Study of the Soybean Root Hair Phosphoproteome in Response to Inoculation with *Bradyrhizobium japonicum*

Tran Nguyen

*University of Missouri*

Among the important agricultural commodities in the U.S., soybean possesses the unique ability to fix atmospheric nitrogen via the interaction with the symbiotic bacterium *Bradyrhizobium japonicum*. This legume-rhizobia interaction is host specific, resulting in the formation of a novel organ, the nodule, where the nitrogen-fixing symbiosis occurs. The interaction begins with the initial recognition of chemical signals (i.e., (iso)flavonoids secreted by the plant host, which triggers rhizobia to synthesize a specific lipo-chito-oligosaccharide signal, called Nod factor). After initial recognition, the infection proceeds via root hair cells with a series of complex cellular events such as calcium spiking, root hair curling, and infection thread development, followed by the formation of the nodule primordia in the root cortex. The molecular mechanisms of these events have not been completely characterized.

Advances in functional genomics have allowed our lab to intensively study the early events in the soybean root hair infection by *B. japonicum*. A large data set containing thousands of genes, proteins, small-molecule metabolites, expressed small RNAs, etc. has been generated in our lab through different approaches such as transcriptomics, proteomics and metabolomics. The recognition of a compatible symbiont by the host requires specific receptor kinases and subsequent kinase cascades. Therefore, the focus of my research project is to define the reversible phosphorylation events in soybean root hairs in response to inoculation by *B. japonicum*. The phosphoproteomic analysis, together with other -omics data, promises to provide us with a system-level view of the infection process in root hairs, a unique, single cell model system. In this talk, an update on plant phosphoproteomics, as well as the method for qualitative and quantitative phosphoproteomic analysis on soybean root hairs will be discussed.

Keywords: soybean, *Bradyrhizobium japonicum*, root hairs, phosphoproteomics

## Targeting Cancer Glycolysis as a New Strategy for Anti-cancer Therapies

Liem Phan<sup>1</sup>, Guermarie Velazquez-Torres<sup>1</sup>, Ismael Samudio<sup>1</sup>, Kenneth Parreno<sup>2</sup>, Yaling Huang<sup>1</sup>, Tseng Chieh<sup>1</sup>, Thuy Vu<sup>1</sup>, Sai-Ching Yeung<sup>1</sup>, Mong-Hong Lee<sup>1</sup>

1. *University of Texas at Houston*

2. *Harvard University*

Breast cancer is the most frequently diagnosed cancer in women in the United States. According to the American Cancer Society, in 2008, there were about 180,000 newly diagnosed American breast cancer patients, and 40,700 cases died due to this disease. Approximately one of every three American women will develop breast cancer during their lifetime. Therefore, a deep understanding about breast cancer biology is crucial to develop novel breast cancer therapies bringing new hope for millions of patients.

In 1930, Nobel laureate Otto Warburg made a striking discovery. He found that cancer cells could convert glucose to energy in the absence of oxygen using a special process called anaerobic glycolysis. Furthermore, he showed that this process is the

## Oral Presentations

most important and preferred energy production mode for these tumor cells. Subsequent studies proved that this procedure is a widespread feature of cancer cells, including breast cancer. This pathway confers a significant survival advantage for cancer cells upon lack of oxygen or under other harsh conditions. This process suppresses cancer cell death, promotes tumor growth and drug resistance. This phenomenon is also very common in breast cancer. It is notable that normal cells can use other ways to produce energy. Therefore, targeting this energy production mode in combination with current anti-cancer therapies can selectively kill cancer cells, and enhance treatment outcome while minimizing side effects.

However, our understanding about the regulation of this energy production mode in cancer cells is limited and requires much more study before effective therapies can be developed. Our research project contributes to expanding current knowledge about this phenomenon in breast cancer to establish the scientific foundation for future targeted therapies. Our initial research results suggest that the protein 14-3-3 $\hat{U}$ , an agent that suppresses cancer, can significantly impair this energy production mode in cancer cells. We hypothesize that the protein 14-3-3 $\hat{U}$  plays an important role in controlling the process of energy making in breast cancer cells. Loss of this agent leads to changes that are favorable for cancer cells energy production, survival and drug resistance. In this study, we will comprehensively examine the impacts of this factor on energy production in breast cancer cells, elucidate the mechanisms and evaluate the importance of this factor using mouse models and human breast cancer samples. It is notable that 90% of breast cancer cells lost the expression of this agent, which implies its significance in controlling cancer progression.

This research project furthers the understanding of the complex regulation of energy-making process in breast cancer cells. This study also contributes to the establishment of a scientific foundation for future breast cancer targeted-therapies. Targeting the energy production in breast cancer cells in combination with current anti-cancer therapies can selectively eliminate breast tumor cells, enhance clinical outcome and reduce unexpected side effects. This strategy is a novel promising trend in breast cancer therapy development and it is currently intensively studied by numerous breast cancer researchers.

## Mining Manufacturing Data for Enhanced Process Characteristics

Salim Charaniya<sup>1</sup>, Huong Le<sup>1</sup>, Keri Mills<sup>2</sup>, Kevin Johnson<sup>2</sup>, George Karypis<sup>1</sup>, and Wei-Shou Hu<sup>1</sup>

1. *University of Minnesota*

2. *Genentech Inc.*

Recombinant protein therapeutics has essentially altered the landscape of modern medicine over the last few decades. The manufacturing facilities for these products are equipped with advanced process control and data archiving systems. The time dynamics of hundreds of process parameters offers a fundamental resource to explore the complexity of bioprocesses and improve production robustness. Manufacturing data from more than one hundred runs expanding from inoculums to production scales was investigated in this study. Each run comprises over 130 online and offline parameters, constituting nearly one million data points. A kernelized support vector regression algorithm was used to integrate all process parameters and develop multivariate predictive models for critical outcome variables. Model evaluation indicates that process performance can be accurately predicted several days before harvest. Furthermore, multiple parameters at the inoculums and early stages of the production scales were identified as indicative markers of the final process outcome. This data-driven approach for knowledge discovery represents an important step towards implementing a real-time decision making scheme for enhanced robustness of large-scale bioprocesses.

## Surface-Induced Phase Separation of O/W Nano-Emulsion

Phong Huynh

*Rutgers University*

The hydrophobic properties of substrates are known to affect wetting behavior of the deposited multiphase droplets. In this study, decomposition of O/W nano-emulsion droplets placed onto various wettable surfaces with controlled hydrophobicity is investigated. It was found that thin film spreading of the oil phase over the substrate surfaces is one of the primary reasons for emulsion decomposition. Our data shows that decomposition occurs first near the droplet pole and not at the contact line. Various techniques (phase contrast optical microscopy, gravimetric measurements and Raman spectroscopy) have been used to reveal the mechanism of the emulsion destabilization. It was found that process of nano-emulsion decomposition on highly hydrophobic surfaces can be described as two-stage process with critical point at which the value of dynamic contact angle is suddenly increased. We propose a simple mass balance model to explain observed phenomena.

Keywords: phase separation, emulsion decomposition, hydrophobicity

# ENVIRONMENTAL ENGINEERING AND SCIENCE

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Session Chairs: Thuy T.H. Nguyen

## Oral Presentations

- 2:45 pm – 3:15 pm      **Martin E.J. Flower and Nguyen Hoang**  
“*The Pivotal Role of Viet Nam in Developing SE Asian Geodynamic Models*”
- 3:15 pm – 3:40 pm      **Thuy T. Hong Nguyen and Andrew Ford**  
“*Modeling Socio-economic and Environmental Impacts of Shrimp Farming in Mekong Delta, Vietnam*”
- 3:40 pm – 3:55 pm      **Break**
- 3:55 pm – 4:15 pm      **Poster Presentation**
- 4:15 pm – 4:40 pm      **Hanh N. Phung-Ngoc**  
“*The Effect of Nanomaterials (Silver Nanoparticles and Nano c60) on E.coli and Paeruginosa*”
- 4:40 pm – 5:00 pm      **Khanh An Huynh and Kai Loon Chen**  
“*Aggregation of Silver Nanoparticles in Aquatic Environments*”
- 5:00 pm – 6:00 pm      **Open Discussion and Networking**

## Poster Presentation

1. Thuy T. Nguyen, Jeff Hepinstall-Cymerman, Ted Gragson, John Chamblee, and Robert G. Pontius Jr.  
“Sensitivity of Land Cover Analysis to Category Aggregation”

## The Pivotal Role of Vietnam in Developing SE Asian Geodynamic Models

Martin F.J. Flower<sup>1</sup> and Nguyen Hoang<sup>2</sup>

1. *University of Illinois at Chicago*

2. *Institute of Technology Development, Media & Community Assistance (IMC)*

Since the late 1970s Viet Nam has become a major focus of interest for Earth and Environmental Scientists, given the still-active Red River Fault, running southeastward via the Hanoi Basin to the Tonkin Gulf, anomalous magmatic activity that followed the abrupt termination of opening of the Eastern Sea, and continues today along the east coast, and the need to exploit precious natural resources, water in particular. Mitigation of seismic hazards and both organic and inorganic pollution remain major challenges for infrastructure development, all of these features ultimately dependent on an understanding of the geodynamic evolution of this region. Pioneer work in geology, geochemistry, and geophysics, not to mention high-resolution satellite-sensed imagery, by scientists in the National Academy of Sciences, and numerous universities, both in Viet Nam and overseas, has thrown light on the complex histories of the Red River and associated faults, origins of the magmatic activity, and the dramatic southeastward motion of the Indochina 'block' since about 35 million years ago. All of these features have been linked to the collision of India with Eurasia some 40 million years ago, although the precise mechanisms involved remain highly contentious. However, there is little doubt that the rapid 'escape' of Indochina was accommodated by the Red River fault, a model that has been validated by significant geological offsets, geodetic (GPS) measurements, and experimental simulations. The experiments successfully replicated a number of observed large-scale features. More recently, however, Kensaku Tamaki (at a 1995 workshop in Hanoi), Mian Liu (using numerical modeling), and Nguyen Hoang (in his 1996 Ph.D. thesis, and subsequent papers) independently raised the possibility that ductile mantle trapped by the approaching thick continental plates, was displaced laterally during both 'soft' and 'hard' stages of the collision, and might therefore be the dominant 'driver' of lithosphere escape, thereby producing partial melting of the upper mantle in association with the complex pattern of strike-slip and extensional faulting observed.

## Modeling Socio-Economic and Environmental Impacts of Shrimp Farming in Mekong Delta, Vietnam

Thuy T. Hong Nguyen and Andrew Ford

*Washington State University*

Intensive shrimp farming is well-known worldwide as not only a highly profitable business but also a risky business. The excessive use of industrial feed, chemicals and antibiotics of this industry has imposed a great impact on the environment. In order to explain the economic incentive leading to dynamic land use and the interaction between this industry and the environment, a dynamic model is built for the case of Dai Hoa Loc Commune in the Mekong Delta of Vietnam. The model includes two modules of Shrimp land and Nitrogen, running from 1999 to 2019. Initial simulations suggest that model results match with stories from the field. Additional analysis reveals the risky nature of the shrimp industry which lies in the choice of starting stock density. Farmers tend to begin with high stock density to obtain huge profit in the first few years without knowing that the corresponding nutrient input will result in precipitous yield drop in subsequent years. Meanwhile, a low stock density brings low profit at first but makes the business sustainable. In the case of a constant stock density of 40 fry/m<sup>2</sup>, the business will close down in nine years. Reducing stock density from 40 to 25 fry/m<sup>2</sup> in 2008 helps sustain the system for 20 years at a yield of 0.75 tons/ha. Further testing combining this method with introducing treatment ponds in the same year results in a yield of 1 ton/ha at the end of the period. The best policy is combining lowering the stock density and improving the channel system to reduce nitrogen load in the channel system. This strategy creates a yield of 1.6 tons/ha from 2014 to the end of the time horizon. Shrimp supply and profit from this policy are both high suggesting that infrastructure development is necessary and practical.

Keywords: intensive shrimp farming, dynamic model, stock density, yield drop, economic incentive

### **The Effect of Nanomaterials (Silver Nanoparticles and Nano c60) on E.coli and P.aeruginosa**

Hanh N. Phung-Ngoc

*The University of Texas at Austin*

Nanomaterials have many applications in science, technology, production, etc. For example, silver nanoparticles are used as biocides in consumer products, wound treatment in clinical practice and semiconductor industries. Nano C60 (Fullerenes) are used in lithium ion batteries, information technology, medical applications, coatings and cosmetics. However, their effects have primarily been examined in planktonic cultures, and there is a lack of research on the effects of nanomaterials on biofilms. The purpose of this paper is to conduct a comprehensive study of the effects of silver nanoparticles and nano C60 on both planktonic and biofilm cultures of *Escherichia coli* (E.coli) and *Pseudomonas aeruginosa* (P.aeruginosa). We will investigate the response of these two bacterial species, living in both biofilm and planktonic cultures, to a 5-hour exposure to these two nanomaterials (silver nanoparticles and nano C60). A second objective is to investigate the ability of bacteria to develop a tolerance capability for sub-lethal concentrations of nanomaterials during reactor germination. Finally, bacteria (E.coli and P.aeruginosa) germinated with and without exposure to sub-lethal concentrations of these two nanomaterials will be compared.

Keywords: nanomaterials, tolerance capability, biofilms, planktonics, bacteria

### **Aggregation of Silver Nanoparticles in Aquatic Environments**

Khanh An Huynh and Kai Loon Chen

*Johns Hopkins University*

Silver has been used since the ancient times because of its antimicrobial activity. Silver nanoparticles now have been used extensively in medicine, consumer products, water purification, etc. Therefore, the widespread use of silver nanoparticles could result in their release into the environment.

The aggregation behavior of silver nanoparticles will affect their mobility in the environment. It depends on the surface coating, the electrolyte concentration, pH, etc. If silver nanoparticles aggregate to form bigger particles, their toxicity may be affected.

By the aggregation kinetic of silver nanoparticles at various environmental conditions is determined in this study by using dynamic light scattering (DLS) technique. The result can be used to predict the fate and transport of silver nanoparticles in aquatic environment.

Keywords: silver nanoparticles, aggregation kinetic, dynamic light scattering technique, toxicity, aquatic environment

## Sensitivity of Land Cover Analysis to Category Aggregation

Thuy T. Nguyen<sup>1</sup>, Jeff Hepinstall-Cymerman<sup>2</sup>, Ted Gragson<sup>2</sup>, John Chamblee<sup>2</sup> and Robert G. Pontius Jr.<sup>1</sup>

1. *Clark University*

2. *The University of Georgia*

A typical challenge in the analysis of land cover change is that maps frequently have so many categories that it is difficult to interpret the results. Category aggregation is one method to reduce the number of categories, but category aggregation must be performed strategically so that it highlights important transitions and ignores unimportant transitions. This study examines how the analysis of land cover transitions over time can be sensitive to category aggregation. Cross-tabulation matrices are used to define land cover categories as net gainers or net losers. Then, the strategic aggregation of gainers with gainers and losers with losers combines pairs of categories for aggregation, which results in a small set of important categories. Cross-tabulation matrices are used to explore how the amount and trend of transitions among categories changes as a function of aggregation. The final set of land transitions is plotted against topographic slope to see whether the transitions are stable over time with respect to slope gradient.

The method is illustrated by using land cover data of the Little Tennessee Watershed within Coweeta Long Term Ecological Research site for three points in time 1986, 1991 and 1996. The initial unaggregated maps have 15 different categories, many of which constitute less than 5% of the landscape. The initial result shows that the aggregation of "Deciduous forest" causes the largest reduction in the total amount of change over the landscape.

Keywords: land cover change, category aggregation, Coweeta

# CIVIL, INDUSTRIAL, MECHANICAL, AND AEROSPACE ENGINEERING

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Session Chairs: Trung Q. Le, Trang Nguyen, Nguyen H.P. Nguyen

## Oral Presentations

- 2:45 pm – 3:05 pm      **Hoang Q. Nguyen**  
*“Development of a Constant Volume Ring Shear Apparatus with Application to Analysis of Submarine Landslides and Offshore Foundations”*
- 3:05 pm – 3:25 pm      **Tam H. Nguyen, Glaucio H. Paulino, Junho Song, and Chau H. Le**  
*“Achieving High Resolution Designs in Topology Optimization via Multiple Discretizations”*
- 3:25 pm – 3:45 pm      **Trung Le**  
*“Electrocardiogram-based Cardiovascular Model”*
- 3:45 pm – 4:00 pm      **Break/Poster Presentations**
- 4:00 pm – 4:20 pm      **Kien Doan and Satish Ukkusuri**  
*“On the Existence of Pricing Strategies in the Heterogeneous Single Bottleneck Model”*
- 4:20 pm – 4:40 pm      **Chau H. Le and Daniel Tortorelli**  
*“Optimization of Material Microstructures for Transient Dynamic Responses”*
- 4:40 pm – 5:00 pm      **Phuong Tran, Soma Sekhar V. Kandula, Philippe H. Geubelle, and Nancy R. Sottos**  
*“Dynamic Fracture Toughness Measurement of Patterned Thin Films”*
- 5:00 pm – 6:00 pm      **Discussions/Networking**

## Poster Presentations

1. **Mayuresh J. Patil, Mahendra P. Singh, Rakesh K. Kapania, Thi D. Dang, Jeffrey Ouellette, Harry Kunaporn, and Arafat Khan**  
*“In-flight Load Constraint Estimation and Residual Life Prediction for Aircraft with Discrete Source Damage”*
2. **Kien Doan and Satish Ukkusuri**  
*“On the Existence of Pricing Strategies in the Heterogeneous Single Bottleneck Model”*

### Development of a Constant Volume Ring Shear Apparatus with Application to Analysis of Submarine Landslides and Offshore Foundations

Hoang Q. Nguyen

*University of Massachusetts Amherst*

In analyzing submarine mass movements and in design of offshore foundation systems, two fundamental questions regarding the undrained shear strength behavior of fine grained soils arise: (1) how do the magnitudes of the undrained and drained residual shear strength differ and, (2) how does the degree and rate of strain softening (i.e., the rate of shear strength degradation from peak to residual) influence progressive failure and the evolution of a slip surface (e.g., in a failed slope or around a suction caisson during installation?) and, more importantly, how does this change with loading conditions, (e.g., rate of shearing/loading?). Answers to these questions are important to the analysis of submarine landslide dynamics as well as the analysis of pile foundations in fine grained soils. In a failing slope, if the rate of strength degradation is fast and the magnitude of undrained shear strength of the soil is low, the time to failure would be swift which could expedite the speed of the mass movement and the volume of the soil mass involved, i.e., in the case of catastrophic landslides and debris flows. In the case of pile installation, if the degradation of undrained shear strength of soil around a pile is large, the pile capacity can be significantly decreased.

A new constant volume ring shear apparatus with application to analysis of submarine landslides and offshore foundations is developed as a practical laboratory test for offshore site characterization. Some of the main functional requirements of the new ring shear apparatus are the feedback control of load (torque), displacement (rate of shearing), and shearing direction which can allow complex tests to be performed simulating various offshore loading conditions; advanced and automated data acquisition by utilizing latest sensor technology, which allows not only real-time high quality acquisition of data, but also real-time feedback control during testing; and new and simple trimming technique and new specimen container that allows trimming and testing of undisturbed samples.

The device allows performing tests on undisturbed fine grained soils to study the effect of rate of shearing (strain rate), initial shear stress ( $\bar{\sigma}_i$ ), and other important factors on the magnitude of  $s_u$ ,  $s_{ur}$  as well as the rate of degradation from  $s_u$  to  $s_{ur}$ .

Keywords: undrained shear strength, ring shear

### Achieving High Resolution Designs in Topology Optimization via Multiple Discretizations

Tam H. Nguyen, Glaucio H. Paulino, Junho Song, and Chau H. Le

*University of Illinois at Urbana-Champaign*

Structural topology optimization aims to find material distribution in the domain to optimize structural performance. Topology optimization using the material distribution method has been well developed and applied to a variety of applications such as structural, mechanical and material systems. The material distribution method rasterizes the domain by defining the topology via the density of pixels/voxels, and thus a large number of design variables are usually required for a well defined design, especially in three-dimensional (3D) applications. This study presents a multiresolution topology optimization (MTOP) scheme to obtain high resolution designs with relatively low computational cost. We employ three distinct discretization levels for the topology optimization procedure: the displacement mesh (or finite element mesh) to perform the analysis, the design variable mesh to perform the optimization, and the density mesh (or density element mesh) to represent material distribution and compute the stiffness matrices. We demonstrate the efficiency of the proposed approach via various two- and three dimensional numerical examples.

Keywords: topology optimization, displacement mesh

## Oral Presentations

### Electrocardiogram-based Cardiovascular Model

Trung Le

*Oklahoma State University*

The mechanism of the cardiovascular system has intrigued researchers for decades. Current cardiovascular dynamics simulation models use assumed simple structures for activation functions. They consequently do not closely reflect the real dynamics of a human heart. This research presents a new method for simulating heart dynamics using electrocardiogram (ECG) as the activation function. Critical ECG features extracted using nonlinear dynamics method were utilized to activate the mechanical actions of valves and cardiac chambers. The model captures the dynamics of heart chambers, valves, pulmonary and systemic circulation loops. Variations in the electric potentials as captured by ECG change the model outputs. These causal relationships are valuable in diagnosing the pathological conditions not revealed in the ECG but need the pressure and heart volume variations. In other words, pathological indications not so evident in the ECG signal can be amplified in the outputs of the model. The model was implemented in Matlab/Simulink environment. The outputs of the ECG-based cardiovascular model simulations were consistent with the established results in cardiology. This ECG-based model can be used to analyze the physiological and pathological conditions of the heart. Thus, the results suggest the importance of integration of the system into real-time monitoring and diagnostic cardiovascular systems.

Keywords: electrocardiogram, cardiovascular model

### On the Existence of Pricing Strategies in the Heterogeneous Single Bottleneck Model

Kien Doan<sup>1</sup> and Satish Ukkusuri<sup>2</sup>

1. *Rensselaer Polytechnic Institute*

2. *Purdue University*

This paper formulates the dynamic system optimal conditions for the single bottleneck model with heterogeneous commuters. This formulation contributes to the literature by solving the system optimal problem with heterogeneous network users. The existence and uniqueness of the problem are shown and discussed. Apart from a rigorous system optimal formulation, this paper develops feasible toll strategies for the single bottleneck problem. The necessary and sufficient conditions for the existence of toll strategies within the single bottleneck are also developed. Extensive computational results are conducted to demonstrate the results in this paper.

Keywords: single bottleneck, system optimal, user equilibrium, heterogeneous commuters

### Optimization of Material Microstructures for Transient Dynamic Responses

Chau H. Le and Daniel Tortorelli

*University of Illinois at Urbana-Champaign*

We will demonstrate the use of topology and shape optimization together with an inverse homogenization technique to design the material microstructure for tailored stress wave propagation. Aspects that may be of interest are: transient sensitivity analysis; material (microstructure) design; and multiscale simulation and optimization.

Keywords: transient optimization, material design

## **Dynamic Fracture Toughness Measurement of Patterned Thin Films**

Phuong Tran, Soma Sekhar V. Kandula, Philippe H. Geubelle, and Nancy R. Sottos

*University of Illinois at Urbana-Champaign*

We present in this paper a novel experimental/numerical protocol to extract the fracture toughness of thin films used in microelectronics and other engineering applications. The testing method involves the dynamic delamination of a patterned thin film initiated by a laser-induced pressure pulse applied on the backside of the substrate. The kinetic energy imparted by the pulse to a weakly bonded (pre-cracked) region of the film is converted into fracture energy as the thin film delaminates in a controlled fashion. To support these experiments and extract the interface fracture toughness values, we develop a numerical scheme based on the combination of a nonlinear beam model used to capture the elastodynamic response of the thin film and a cohesive failure model to simulate the spontaneous propagation of the delamination front. The beam model is verified by the 2-D hybrid spectral/FE scheme and then validated with experimental results.

### **In-flight Load Constraint Estimation and Residual Life Prediction for Aircraft with Discrete Source Damage**

Mayuresh J. Patil, Mahendra P. Singh, Rakesh K. Kapania, Thi D. Dang, Jeffrey Ouellette, Harry Kunaporn, and Arafat Khan  
*Virginia Polytechnic Institute and State University*

The objective of this study is to develop a consistent interface to couple the damage assessment into flight analysis and the flight loads into damage models. This will require computationally efficient, reduced-order models and probabilistic framework for damage propagation and for structural loads on a damaged aircraft. Furthermore, coupling with control design and closed-loop simulation requires low-order models for aeroservoelasticity.

### **On the Existence of Pricing Strategies in the Heterogeneous Single Bottleneck Model**

Kien Doan<sup>1</sup> and Satish Ukkusuri<sup>2</sup>

1. *Rensselaer Polytechnic Institute*

2. *Purdue University*

(see abstract page 60)

## Oral Presentations

3:00 pm – 3:30 pm

**Dung Nguyen**

*“Recent Progress in Twistor theory and Scattering amplitudes”*

3:30 pm – 4:00 pm

**Trung Nguyen and Sharon Glotzer**

*“Hierarchical and Reconfigurable Self-assembly of Laterally Tethered Nanorods”*

### Recent Progress in Twistor Theory and Scattering Amplitudes

Dung Nguyen

*Brown University*

In this talk, we discuss some recent progress in twistor theory that triggering new understanding of scattering amplitudes in gauge theories and gravity. We focus on the new theory by Arkani-Hamed, Cachazo, Cheung and Kaplan and their proposal for a dual formulation for the S Matrix of  $N = 4$  Super Yang-Mills theory. The proposed dual provides a basis for leading singularities of scattering amplitudes to all orders in perturbation theory. We introduce some explicit checks at 3 loops of this proposal.

We also present and prove a formula for the MHV scattering amplitude of  $n$  gravitons at tree level. Some of the more interesting features of the formula, which set it apart as being significantly different from many more familiar formulas, include the absence of any vestigial reference to a cyclic ordering of the gravitons--making it in a sense a truly gravitational formula, rather than a recycled Yang-Mills result, and the fact that it simultaneously manifests both  $S_{\{n-2\}}$  symmetry as well as large- $z$  behavior that is  $O(1/z^2)$  term-by-term, without relying on delicate cancellations. The formula is seemingly related to others by an enormous simplification provided by  $O(n \wedge n)$  iterated Schouten identities, but our proof relies on a complex analysis argument rather than such a brute force manipulation. We find that the formula has a very simple link representation in twistor space, where cancellations that are non-obvious in physical space become manifest.

Keywords: twistor theory, scattering amplitude, MHV tree formula

### Hierarchical and Reconfigurable Self-assembly of Laterally Tethered Nanorods

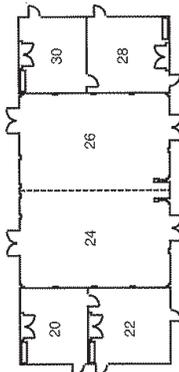
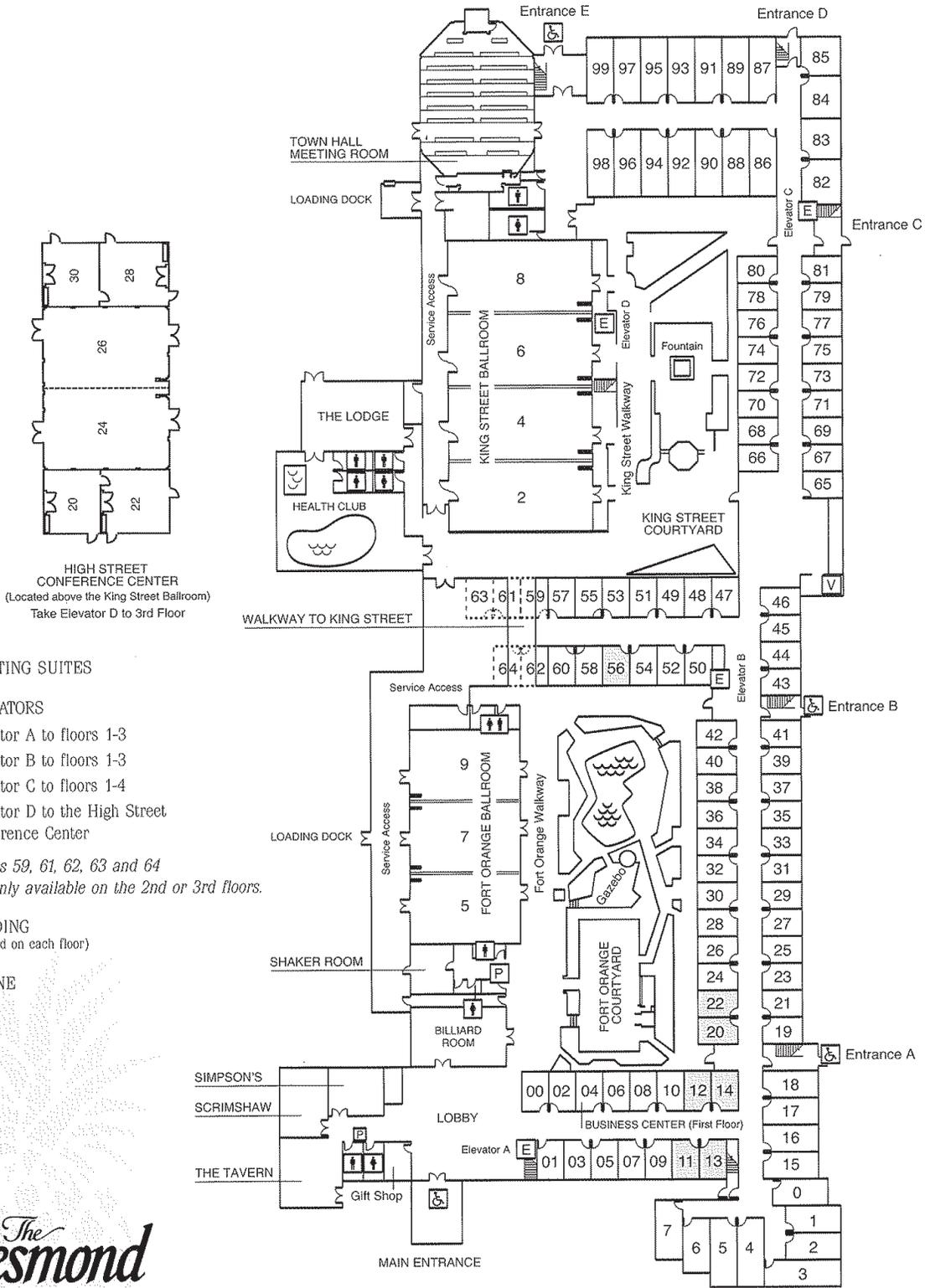
Trung Nguyen and Sharon Glotzer

*University of Michigan at Ann Arbor*

Applications of reversible transformations between nanostructures can be found in a broad range of advanced technologies including smart materials, electromagnetic sensors, and drug delivery. In this work, we propose two model nanostructures assembled by laterally tethered nanorods that are able to reversibly reconfigure in response to changes in environmental conditions. In the first model, we show that pre-assembled flat bilayer sheet scrolls into distinct helical morphologies depending on the solvent selectivity. When the solvent condition is switched, the helices transform accordingly from one morphology to another. In the second model, we report a reversible transformation between two ordered structures, i.e. bilayer sheets and a rectangular grid, assembled by laterally tethered rods with different rod lengths. When the rod segments are expanded or shortened in a short period of time as compared to the system relaxation time, presumably due to certain external stimuli, a reversible transformation between those structures is induced. These models serve both to inspire the fabrication of laterally tethered nanorods for assembling higher order nanostructures at nanometer scales and as a proof-of-concept for engineering reconfigurable nanomaterials via hierarchical self-assembly.

Keywords: reconfigurable nanostructures, hierarchical self-assembly, tethered nanoparticles, computer simulation

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- Elevator C to floors 1-4
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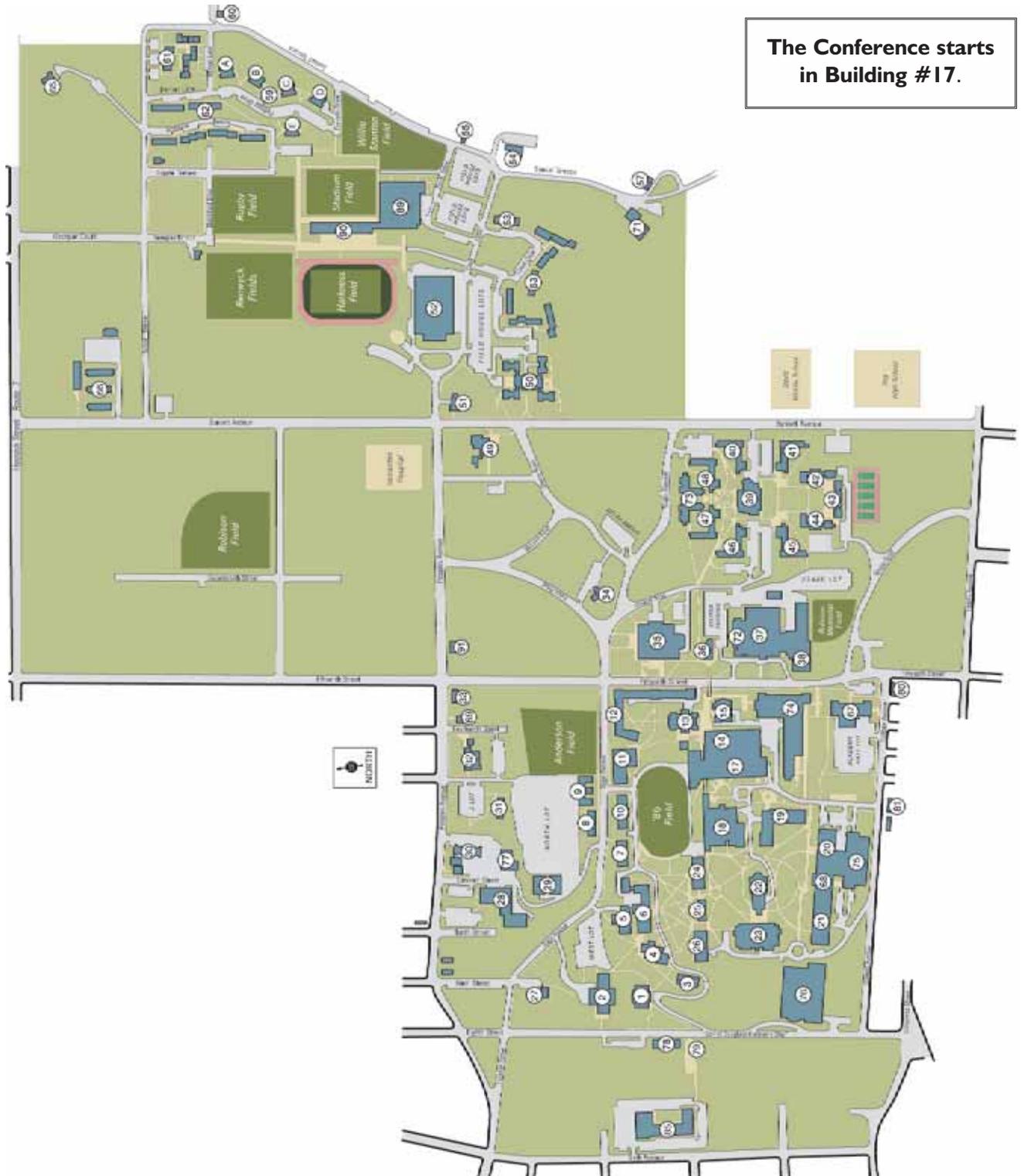
VENDING  
(located on each floor)

PHONE



# MAPS

## RPI Campus

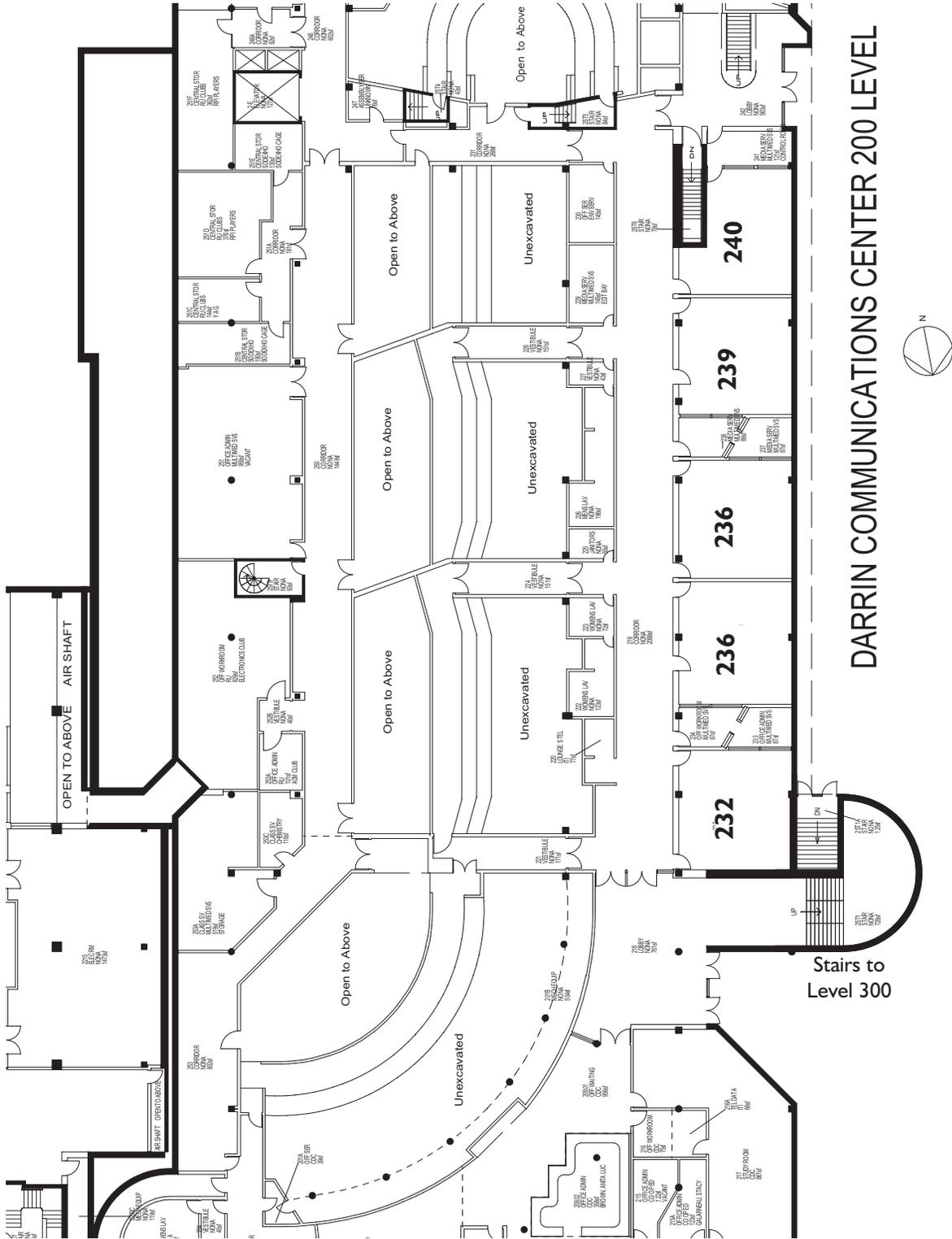


**CAMPUS MAP KEY - (IN NUMERICAL ORDER)**

1. Pittsburgh Building
2. West Hall
3. Carnegie Building
4. Walker Laboratory
5. Boiler House
6. Russell Sage Laboratory
7. Troy Building
8. North Hall
9. E Complex
10. Ricketts Building
- 11. '87 Gymnasium**
12. Quadrangle Complex
13. Russell Sage Dining Hall
14. Low Ctr. for Industrial Innovation (CII)
15. Playhouse
- 17. Darrin Communications Ctr. (DCC)**
- 18. J. Erik Jonsson Engineering Ctr. (JEC)**
19. Jonsson-Rowland Science Ctr.  
(Hirsch Observatory)
20. Cogswell Laboratory
21. Materials Research Center
22. Voorhees Computing Ctr.
23. Folsom Library
24. Greene Building
25. Lally Hall
26. Amos Eaton Hall
27. 41 Ninth Street
28. Service Building
29. Blaw-Knox 1 & 2
30. J Building-Incubator Ctr.
31. H Building
32. Heffner Alumni House
33. 2021 Peoples Ave
34. Admissions
- 35. Rensselaer Union**
36. Public Safety
37. Alumni Sports & Recreation Ctr.
38. Robison Swimming Pool
39. Commons Dining Hall
40. Crockett Hall
41. Nason Hall
42. Davison Hall
43. Sharp Hall
44. Nugent Hall
45. Warren Hall
46. Hall Hall
47. Cary Hall
48. Bray Hall
49. Chapel and Cultural Ctr.
50. Burdett Residence Hall
51. 2144 Burdett Avenue
52. Houston Field House
53. Rensselaer Apartment Housing Project  
RAHP A Site (Single Students)
54. 200 Sunset Terrace
55. Seismograph Laboratory
57. Greenhouses and Grounds Barn
59. Stacwyck
  - 59A. Rousseau
  - 59B. Williams
  - 59C. Wiltsie
  - 59D. McGiffert
  - 59E. Thompson
60. Radio Club W2SZ
61. Bryckwyck
62. Rensselaer Apartment Housing Project  
RAHP B Site (Married Students)
65. Patroon Manor (1 Detroit Drive)
66. Colonie Apartments
67. Academy Hall (Financial Aid,  
Student Life Services Ctr., Health Ctr.)
68. Empire State Hall
69. Beman Park Firehouse
71. 133 Sunset Terrace
72. Mueller Center
73. Barton Hall
- 74. Center for Biotechnology and  
Interdisciplinary Studies (CBIS) (Biotech Ctr.)**
75. Parking Garage
76. Experimental Media and Performing Arts Ctr. (EMPAC)
77. Boiler House, 11th Street
78. Winslow Building
79. Lewis Rubin Memorial Approach
80. Java++ Cafe, 1527 Fifteenth Street
81. RPI Ambulance
85. Blitman Residence Commons
89. East Campus Athletic Village Arena
90. East Campus Athletic Village Stadium
91. Graduate Education, 1516 Peoples Ave.

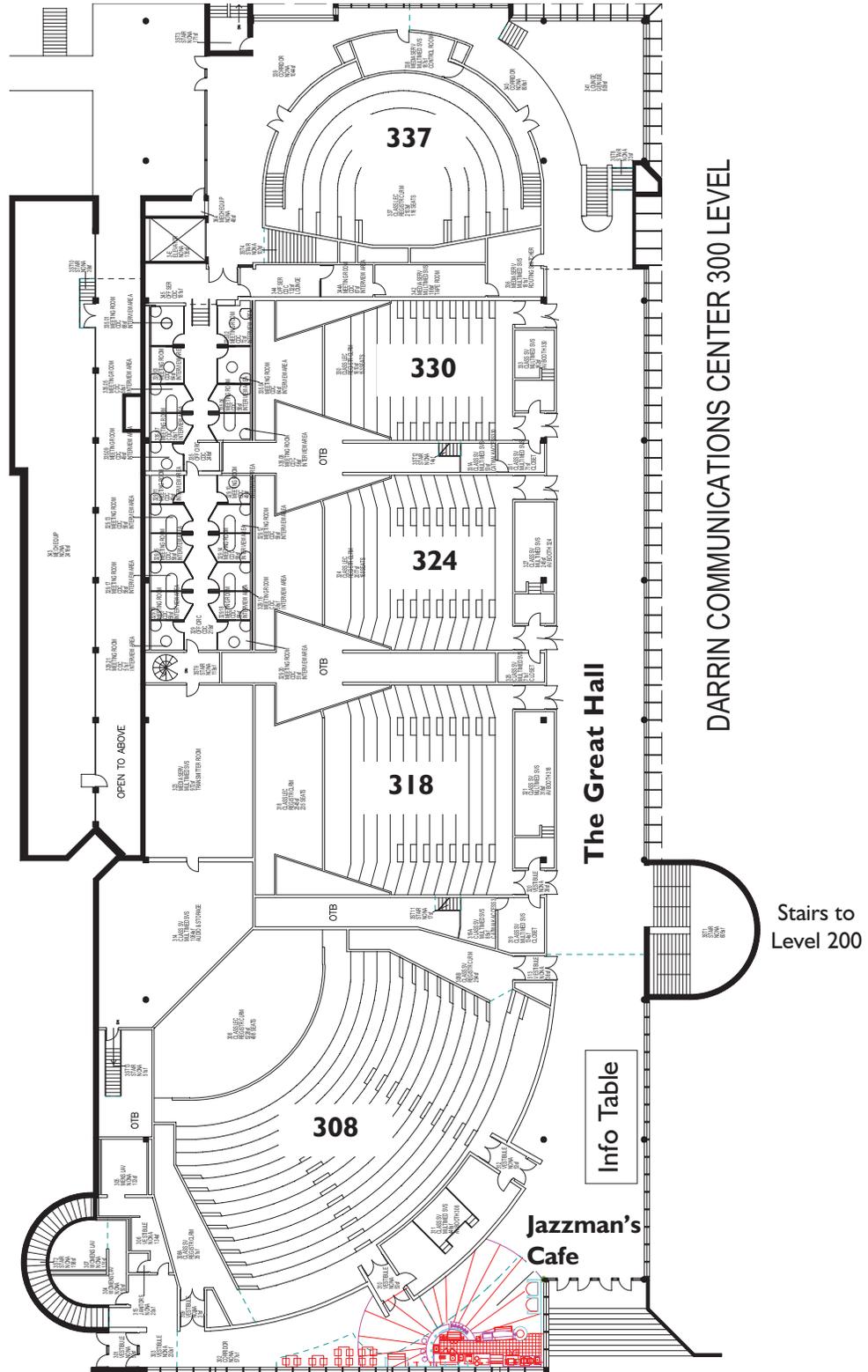
# MAPS

## Darrin Communications Center (DCC) - Level 200



### DARRIN COMMUNICATIONS CENTER 200 LEVEL

Darrin Communications Center (DCC) - Level 300







## About Us

Founded by 4 passionate Internet entrepreneurs in 2004, VinaGame (VNG) has quickly emerged to become Vietnam's leading online company with more than 1200 employees in 3 of the largest cities in Vietnam: Ho Chi Minh City, Hanoi, and Danang.

## VNG

- **Specializes** in Entertainment and Community Internet services
- **Serves** 10 million monthly customers and has 50M USD in revenue this year
- **Is** the no. 1 online game publisher in Vietnam, with 50% market share
- **Is** the no. 1 domestic online service provider
- **Owns** the biggest and most advanced Internet data center in Vietnam and hosts ~1500 servers. Our internet service populates 50% of Vietnam's backbone in network capacity
- **Won** more than 30 prestigious awards for Game and Web products within 5 years of operations

## Our Core Values

- **Passion:** Enthusiastically living out belief in the company and its products
- **Eager to improve:** Constantly seeking and adopting new ideas that advance capability
- **Resourcefulness:** Flexibility accomplishing work effectively, even in the face of adversity
- **Responsibility:** Devotion to work and personal accountability
- **Teamwork:** Taking the initiative in cooperating with others to accomplish bigger and better things
- **User focus:** Obsessed with delivering more true value to the user

## Warm Greetings to the 7th Annual Vietnam Education Foundation Conference!

We are very much honored to be a platinum sponsor for the Scientific Sessions at the 7th Annual VEF Fellows and Scholars Conference. Best wishes to you for a successful Conference!

Being a leading company in online services, we believe that VNG is a great place for the talent like VEF Fellows to build a career, serve our home country, and be rewarded.

We strongly encourage you to take a close look at the exciting job opportunities that we offer. We hope you will share with us the belief in VNG's lasting success and we look forward to welcoming you as a new member of our enthusiastic, creative and professional VNG family.

- To explore VNG, please visit our website: [www.vinagame.com.vn](http://www.vinagame.com.vn)
- To join us, please send your updated CV to [recruitment@vinagame.com.vn](mailto:recruitment@vinagame.com.vn)



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