

Varunyu Khamviwath

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OBJECTIVE

An internship position in a dynamic and intellectual environment

EDUCATION

University of Minnesota, Minneapolis, MN

Ph.D., Mathematics, Math Biology (Minor: Numer. Anal. & Diff. Eqns.), expected 2011
M.S., Mathematics, 2009
Advisor: Hans G Othmer

University of California, Los Angeles, CA

M.S., Electrical Engineering, Control Systems, 2003

Chulalongkorn University, Bangkok, Thailand

B.Eng., Electrical Engineering (1st class honors), 2002
Senior Thesis: Matching for Control Systems with Time Delays
Advisor: Suchin Arunsawatwong

RESEARCH EXPERIENCE

Research Assistant in Mathematical Biology

01/2008 – Present

School of Mathematics, University of Minnesota, Minneapolis, MN

- Prove and computationally verify that adaptation to constant background signals, a key property of cell motility, originates in early signal transduction processes. Derive a highly-simplified adaptation model suitable for large-scale simulations.
- Optimize an existing finite-difference algorithm and develop a customizable interface (MATLAB) to simulate reaction-diffusion equations. The optimized code runs 80 times faster, making simulations of actual experiments possible.
- Develop and implement a finite-element algorithm (MATLAB) to solve reaction-diffusion equations with ODE boundary conditions in 2D & 3D.
- Review and maintain up-to-date experimental results in literature on cell signaling to ensure realistic mechanisms are modeled.

Graduate Research Assistant

03/2003 – 12/2003

Flight Systems Research Center, University of California, Los Angeles, CA

- Studied Navier-Stokes equations, transonic aerodynamics, and vibration of wind turbines.

Research Assistant

06/2001 – 07/2002

Control Systems Laboratory, Chulalongkorn University, Bangkok, Thailand

- Extended the theory of the Principle of Matching to delayed systems.
- Developed control system design algorithms (MATLAB, C) for critical delayed systems.
- Modeled and designed seismic control systems for a 10-story building. The developed algorithms were implemented to ensure that maximum displacements between building stories were strictly under structural requirements.

INDUSTRY EXPERIENCE

Analyst

05/2005 – 08/2005

Tonson Capital, Bangkok, Thailand

- Conducted portfolio optimization, analyzed statistical patterns and correlations of stock prices, and devised an arbitrage strategy for Thai market.
- Designed and implemented VBA code to automatically retrieve and store daily market data from different sources in Excel spreadsheets for statistical and technical analyses.

Senior Electrical Engineer
Servo Tech Inc., Chicago, IL

06/2004 – 04/2005

- Researched fuel efficiency and regenerative energy of mobile working machines for Caterpillar. Reviewed literature and patents on regenerative systems and components.
- Analyzed energy losses in an excavator working cycle using Dynasty. Identified current design flaws and energy recovery potentials for regenerative systems.
- Delivered designs and specifications of regenerative hydraulic systems and electric-hybrid systems achieving 20% efficiency improvement.
- Proposed a control concept based on PWM which potentially increases the efficiency of hydraulic systems to 90%.

Engineering Intern
Seagate Technology LLC, Samutphakarn, Thailand

03/2001 – 05/2002

- Implemented a GPIB interface for data acquisition of Head Stack Resonance Test.
- Automated test procedure, data collection, and data analysis using LabVIEW. Wrote a test manual and a technical report.
- Cooperated with engineers and testers to establish requirements and to migrate test platforms without interruption.

TEACHING EXPERIENCE

Teaching Assistant
School of Mathematics, University of Minnesota, Minneapolis, MN

09/2006 – 12/2007

- Led discussion sections and Mathematica lab sections in calculus and differential equation classes. Graded assignments on abstract algebra.

Teaching Assistant
Department of Electrical Engineering, University of California, Los Angeles, CA

01/2003 – 03/2003

- Graded assignments for an upper division course, Introduction to Communication Systems.

COMPUTER SKILLS

Programming: FORTRAN, C/C++, VBA, Pascal, HTML

Software: MATLAB, Mathematica, Comsol, Dynasty, LabVIEW

Operating Systems: Windows, Unix, Mac OS, DOS

HONORS AND AWARDS

Summer fellowship, School of Mathematics, University of Minnesota (2007)
Ranked 1st in engineering, college entrance examination, Thailand (1998)
Silver medalist, Thailand Mathematics Olympiad (1997)

EXTRACURRICULAR ACTIVITIES

Vice president, Thai Student Association, University of Minnesota (2007 – 2008)
Performer, Thai shadow puppet in Culture Night, UCLA (2004)
Silver medal, engineering school bridge competition, Thailand (2001)
Student official, rhetoric club and bridge club, Chulalongkorn University (2000 – 2002)
Organizing committee, CU Music Awards, Chulalongkorn University (2000)
Organizer, freshmen debate competition, Chulalongkorn University (1999)

MISCELLANEOUS

Academic Progress: 5th year graduate student, Preliminary exams passed (oral 09/2009, written 08/2007)

Research Topic: Directional Sensing and Polarization in Dictyostelium Discoideum Amoebae

Relevant Coursework: Numerical Analysis, Mathematical Modeling, Mathematical Biology, Probability, Theory of ODEs, Theory of PDEs, Dynamical Systems, Functional Analysis, Optimization Techniques, Linear System Theory, Nonlinear Stability Theory, Optimal Control Theory, Robust Control Theory, Stochastic Processes, Kalman Filtering Theory, Aeroelasticity Theory