2011 SEEDS "You Choose" Awards Proposal

ENGINEERING SEMINAR SERIES: EXPOSURE TO FEMALE ROLE MODELS

Submitted by

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Assistant Professor

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Seminar Timeline: Spring 2011, Fall 2011, and Spring 2012, one seminar each semester.
Submission Date: November 5, 2010
Total Funding Requested: $2,500
ABSTRACT
In this initiative, I propose to arrange a 3-talk 3-semester seminar series inviting distinguished female faculty from the profession of Systems and Industrial Engineering focusing on simulation and modeling of sustainable systems including energy power systems. Proposed seminar series will create opportunities for junior faculty to meet and mingle with female role models of engineering profession who share the similar career goals and have experienced the same barriers (and somehow passed) during their tenure process. This initiative also aims to motivate female students to pursue careers in science, engineering, mathematics and technology and to support them in their studies.

GOALS
Women’s representation in science-based professions is significantly lower than men’s compared to other professions (Chu, 2006). This representation becomes even lower at the academic level. According to the NSF report on female faculty positions (2008), women were about 1% of full-time tenured or tenure-track faculty in engineering in 1979 and 10.8% in 2006. Similarly, the women comprised less than 1% of full professor positions in engineering in 1979. While this number reached to about 5% in 2006, it still is severely less than the men’s share of similar positions. The survey data used in this NSF report reflects a continued trend in the male-dominance of engineering profession over the years.

Past research and studies (Phipps, 2002; and Stonyer, 2001) have suggested that the reason behind the underrepresentation of women in engineering profession is because the identity of “engineer” is based upon ideas developed by previous generations of engineers — men. Nowadays, however, women facing the dilemma of being women and being engineers, build their identities as women engineers. I am one of those women engineers, and my research on decision making involving adaptive simulations is one of those works targeting to increase women representation in engineering profession. However, because of the aforementioned low percentage of women faculty in engineering, the junior female faculty cannot have many chances to meet, interact, or even mentored by senior women faculty. To this end, the goal of this proposal is threefold:

1. To expose the young female researchers and students to successful women faculty in engineering with innovative research as role models,

2. To create a setting for exchange of ideas which will help the young faculty to plant the seeds of collaboration for research advancement, grant proposals, and journal and conference publications,

3. To facilitate the inter-departmental collaboration at the University of Miami (UM) by inviting researchers conducting interdisciplinary research. Therefore, these seminars will be announced in various departments of the College of Engineering and the School of Business Administration at UM.

This proposal will serve as a follow-up effort on the "You choose award" 2009 received by Eunji Lim for hosting departmental seminars. However, the 3-talk 3-semester seminar series proposed here differs from aforementioned award by two means. First, only distinguished women faculty
will be invited as female role models for the junior faculty, students and members of the University of Miami at large. Second, seminars will be focusing on modeling and simulation of sustainable systems including distributed energy power systems.

CONTRIBUTION OF AWARD TO CAREER AND SCHOLARLY GOALS

The contribution of this award to my career and scholarly goals will be twofold as explained below.

1. My research work focuses in the area of decision making for large-scale and complex systems (i.e., supply chains, and distributed energy power systems) using adaptive simulations. The goal of this research is to adaptively adjust the fidelity (level of detail) of a simulation model against available computational resources by incorporating dynamic data into the executing model, which then steers the measurement process for selective data update. To this end, four algorithms are developed and embedded into a real-time simulator for its decision making capability, including 1) data filtering algorithm involving control charts, 2) fidelity selection algorithm involving Bayesian inferencing, 3) fidelity assignment algorithm involving mathematical programming, and 4) task generation algorithm involving meta-heuristics and fast-mode simulations. Grid computing and Web Services are used for management of computational resources and inter-operable communications among distributed software components, respectively. A prototype of the proposed simulation has been successfully demonstrated for preventive maintenance scheduling and part routing scheduling in a semiconductor manufacturing supply chain, and research is ongoing for its application in distributed energy power systems. Therefore, the invited speakers for this seminar series will be selected to share their experience, and knowledge in adaptive simulations, optimization and distributed energy power modeling.

2. There is no doubt that a successful career in scientific research necessitates creative writing and communication of research ideas as well as findings. However, in addition to these, visions and insights obtained via networking and interacting with established and funded senior colleagues play a crucial role in acquisition of grants from national institutions such as National Science of Foundation, and/or industrial agencies. The proposed seminar series will enable me as a junior faculty to meet with experienced, funded senior women faculty in the Engineering profession and plant the seeds of a professional relationship with them.

BUDGET

Projected expenses for the proposed 3-talk 3 semester seminar series is shown in Table 1 below.

<table>
<thead>
<tr>
<th>Budget Justification</th>
<th>Estimated Cost</th>
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<tbody>
<tr>
<td>Roundtrip Airfare (3 speakers, $500 per speaker)</td>
<td>$1500</td>
</tr>
<tr>
<td>Hotel (3 speakers, 2 nights per speaker at $150)</td>
<td>$900</td>
</tr>
<tr>
<td>Publications and Dissemination (3 speakers)</td>
<td>$100</td>
</tr>
<tr>
<td><strong>Total Funding Requested</strong></td>
<td><strong>$2500</strong></td>
</tr>
</tbody>
</table>
REFERENCES
Burrelli, J., 2008, Thirty-three years of women in S&E faculty positions, National Science Foundation Report, NSF 08-308.
NURCIN CELIK, BIOSKETCH

NAME: Nurcin Celik

PROFESSIONAL PREPARATION
- Ph.D., Systems and Industrial Engineering, University of Arizona, 2010.
- M.S., Systems and Industrial Engineering, University of Arizona, 2008.
- B.S., Industrial Engineering, Bogazici University, 2006.
- Exchange Program, University of Arizona, 2005.

APPOINTMENTS
- 2010-Present, Assistant Professor, Industrial Engineering, University of Miami.
  Area of Research: Dynamic-data-driven adaptive simulations, distributed and hybrid
  modeling paradigms, computationally feasible analysis of massive datasets, planning and
  control of large-scale dynamic systems such as manufacturing supply chains, and distributed
  power grid.
- 2006-2010, Research Assistant, Computer Integrated Manufacturing and Simulation Laboratory,
  University of Arizona.
- Summer 2009-2010, Instructor, Summer Engineering Academy for the 21st Century sponsored
  by Motorola Foundation, University of Arizona.
- Spring 2009, Teaching Assistant, Systems and Industrial Engineering, University of Arizona.
- Fall 2007, Teaching Assistant, Systems and Industrial Engineering, University of Arizona.
- Summers 2004-2006, Engineering Intern, BMW Turkey Distributor Borusan Otomotiv.
- Spring 2005, Research Intern, Entomology Department, University of Arizona.

PUBLICATIONS
Related to Project
   Framework for Supply Chain Systems, IIE Transactions on Operations Engineering, 42, 325-
   341.
2. E. Mazhari, J. Zhao, N. Celik, S. Lee, Y. Son, and L. Head, 2011, Hybrid Simulation and Opti-
   mization-based Capacity Planner for Integrated Photovoltaic Generation with Storage Units,
   Simulation Modeling Practice and Theory, 19, 463-481.
3. N. Celik and Y. Son, 2010, Sequential Monte Carlo-based Fidelity Selection in Dynamic-Dat-
   a-Driven Adaptive Multi-Scale Simulations, under review, International Journal of
   Production Research.
   matic Partitioning of Large Scale Simulation in Grid Computing for Run Time
   Reduction, International Journal of Operations Research and Information Systems, 1(2), 64-
   90.
5. N. Celik and Y. Son, Dynamic Data Driven Simulation for Coherent Control of Distributed
   Manufacturing Enterprises, Darea, F., Douglas, C (Eds.), Springer, under review.

Other Publications
   Hierarchical Decision-Making in Manufacturing Supply Chains, article in press, Journal of
   Intelligent Manufacturing.
2. E. Mazhari, X. Zhao, N. Celik, S. Lee, and Y. Son, Hybrid Simulation and Optimization-based
   Capacity Planner for Integrated Photovoltaic Generation with Storage Units, Proceedings of
   the Winter Simulation Conference 2009.
   Decision Aids in Enterprise Software Development Process, International Journal of

Nurcin Celik


**HONORS and AWARDS**

- Outstanding Graduate Student Award, University of Arizona, 2008 and 2010.
- Best Ph.D. Scientific Poster Award in the Ph.D. Colloquium, IER2009.
- Best MS Thesis Award, IIE Annual Meeting 2009.
- The UA nominee for the WAGS/UMI Distinguished Master’s Thesis Award.
- Outstanding Graduate Research Assistant, *First Place*, Graduate and Professional Student Council (GPSC), University of Arizona, April 2009
- Honored with Mayors Award, Arizona, 2005.
- Ranked 25th among over 1.5 million students in Nationwide University Entrance Examination of Turkey, 2001.

**SYNERGISTIC ACTIVITIES**

**Broadening the participation of under-represented groups:** I have mentored more than thirty female high-school students coming from diverse backgrounds on pursuing an education focusing on science and engineering as a volunteer of Women in Science and Engineering program at the University of Arizona (2009). I have also actively participated in an on-campus high school level teaching initiative called Summer Engineering Academy aiming to recruit students from under-represented groups to join the engineering school (2009-2010). I have given lectures, and helped students play a web-interactive supply chain management game in order to have full understanding of long-term effects of operational decisions. Furthermore, in the Computer Simulation Systems course that I teach at UM, I make sure to provide my students with an equal opportunity environment to access all resources and participate to the class.

**Service to the scientific and engineering community outside of my immediate organization:** I have presented our research findings in the area of integrated decision making involving adaptive simulations at more than 12 national and international conferences during 2006-2010. I have also given two invited talks where I shared our research plan on energy power modeling. In addition, I am the **founding member** and **treasurer** of INFORMS (Institute for Operations Research and the Management Sciences) Student Chapter at the University of Arizona (2007-2010) which is selected as the **winner of the 2009 INFORMS Student Chapter Annual Award**. I served twice as the session chair in national conferences (2009). I am currently a member of INFORMS, IIE (Institute of Industrial Engineers), and SME (Society of Manufacturing Engineers) since 2005 and serve as the reviewer in WSC (Winter Simulation Conference) since 2008.

**COLLABORATORS & OTHER AFFILIATIONS**

- Shihab Asfour, Professor, University of Miami
- Larry Head, Professor, University of Arizona
- Nazrul Shaikh, Assistant Professor, University of Miami
- Brian Joseph McGough, Manager, Systems Integration at Indiana University
- Joseph H. Simmons, Co-Director, Arizona Research Institute for Solar Energy
- Ardeth Barnhart, Co-Director, Arizona Research Institute for Solar Energy

(b) Doctoral Advisor: Dr. Young-Jun Son, University of Arizona.

*Nurcin Celik*
Subject: SEEDS award  
From: Kathryn Tosney <ktosney@miami.edu>  
Date: Thu, 20 Jan 2011 16:42:26 -0500  
To: <celik@miami.edu>, Natasha Jobbagy Schiller <natasha@bio.miami.edu>  

Dear Nurcin, celik@miami.edu  

Congratulations, your SEEDS You Choose application for a seminar series in Engineering has been selected and will be fully funded! Dean Tien has provided cost share.  

You and the other winners will soon be profiled on the SEEDS home page and on awards page, http://www.as.miami.edu/seeds/. As described in the application, your proposal will be uploaded to the SEEDS site later this term, to form a model for others.  

Attached is a SEEDS Quick Guide which will help you as you put your proposal into action. Our SEEDS Program Manager, Natasha Jobbagy Schiller will help you to organize your seminar series. She will assist you with travel arrangements, advertising for your event and any other logistics associated with planning your events. Please consult with her prior to making any purchases to ensure you remain within budget and within sponsored programs regulations. All funding should be spent and payments processed by 08/31/12 when our SEEDS grant is scheduled to end.  

Because NSF requires that all SEEDS events must be evaluated, we will need evaluations after each event, before any funds will be disbursed for further events. Evaluation sheets will be provided for you to distribute to all your event participants and must be returned to the SEEDS office immediately following your event. In addition, a one-page report is required with updates on your progress towards achieving the goals outlined in this proposal. Because you are hosting a series of events, you will be required to submit these reports after each of the seminars that takes place in your series. Once the evaluations and reports are received, funding for your next seminar will be released for your use.  

SEEDS is excited to support your work and we look forward to hearing about your progress.  

Best,  
Kathryn  

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Professor Kathryn Tosney  
Chair of Biology  
Director of SEEDS (Scientists and Engineers Expanding Diversity and Success)  
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