

*Stokes*

DOE/IMA/2002-1

**IMA Career Workshop**  
**Connecting Women in Mathematical Sciences to Industry**

**Final Report**  
**Project period 8/1/2000 to 12/30/2000**

**Willard Miller and Fadil Santosa**  
**Institute for Mathematics and its Applications**  
**University of Minnesota**  
**Minneapolis, MN 55455**

March 2002

Prepared for

**The US Department of Energy**  
**Award number DOE/DE-FG02-00ER25432**

**Notice**

This report was prepared as an account of work sponsored by the United States Government. Neither the United States Government nor the United States Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for product or process disclosed or represents that its use would not infringe privately-own rights.

### **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

## **Abstract**

The Institute for Mathematics and its Applications (IMA) was awarded a grant by the Department of Energy that provided partial support for the IMA Career Workshop: Connecting Women in Mathematical Sciences to Industry. The workshop took place on September 8 to 10, 2000 at the IMA was co-sponsored by the Association for Women in Mathematics (AWM), and also received additional funding from Coastcom. This report highlights the activities and the accomplishments of the program.

## **Introduction**

Many women with training in mathematical sciences are employed in companies and have made very good careers in industry, some taking leading roles in their organization. We find that these women in general find their career to be quite rewarding. The mathematical problems they work on are often quite challenging, involving modeling, analysis and simulation, and at the same time, they are interdisciplinary, involving team members with very different training and background. However, the number of women in mathematical sciences working in industry is still quite low. There seems to be a lack of awareness of the possibility of fulfilling careers in industry. We have also observed that collaborations involving women mathematics faculty and industry are few in numbers.

The goals of the IMA Career Workshop: Connecting Women in Mathematical Sciences to Industry are

- Inform and increase awareness about opportunities for women mathematicians in industry,
- Provide a forum where graduate students in mathematics and other young researchers can make contact with mathematicians from industry and government laboratories,
- Discussion and strategy formulation on lowering the entry barrier to careers in industry and collaboration with industry.

The two-day workshop organized by Rosemary Chang (Coastcom), Suzanne Lenhart (University of Tennessee in Knoxville), and Margaret Wright (then at Bell Laboratories, Lucent Technology). The program consisted of presentations, panel discussions, and breakout groups, in addition to some social events. It was attended by over 75 participants, the majority of whom were female math graduate students from around the country.

### **List of speakers and titles of their presentations**

1. **Rosemary E. Chang** (Coastcom) "Some Realities of Working in Industry"
2. **Lynne E. Parker** (Oak Ridge National Laboratory) "Multi-Robot Cooperation: From Fundamental Research to Real-World Applications"
3. **Sarah Holte** (Fred Hutchinson Cancer Research Center) "A Competition Model for Viral Inhibition of Host Cell Proliferation"
4. **Sharon Filipowski** (Boeing Company) "Applications of Nonsmooth Optimization in Industry"
5. **Carolyn R. Cho** (SmithKline Beecham R&D) "Modeling Osteoporosis: Parathyroid Hormone Receptor Binding Kinetics"

6. **Anna Gilbert** (AT&T Shannon Lab) "New Problems in Industrial Mathematics Research"
7. **Kathleen Hoffman** (University of Maryland, Baltimore County) "A Simple Model of Sheet Metal Assembly"
8. **Tamara G. Kolda** (Sandia National Laboratories) "Optimization, Engineering, and Cluster Computing"

Dinner speaker was **Alessandra Chiareli** (3M), "On Becoming an Industrial Mathematician and the Mathematics of Fiber Optics".

A panel discussion entitled "Finding Opportunities in Industry", moderated by Suzanne Lenhart, featured Bin Yu (Bell Labs, now at UC Berkeley), Bozenna Pasik-Duncan (University of Kansas), Sarah Holte (Fred Hutchinson Cancer Research Center) and Kathy Brenan (Aerospace Corporation).

The participants formed 2 breakout groups, each given a topic of discussion, and charged with making a presentation summarizing their discussion on the last day. The topics for discussion include: "How can colleges, universities, industry, government laboratories, funding agencies, and professional organizations encourage women mathematical scientists to become involved with industrial problems?", and "What strategies and policies would be constructive?"

### **Outcome**

The importance of this workshop is reflected in the two articles written about it. One article appeared in the SIAM News, Volume 34, Number 1, 2001, and the other, in the Newsletter of the AWM, Volume 30, Number 6, 2000. More importantly, the workshop, which was attended about 50 female graduate students in Mathematics, made a lasting impression on these students. These students were exposed to opportunities for mathematical scientists in industry and government laboratories. They were made aware of the rewarding careers in these sectors, and also of the possibilities of collaborating with industry as mathematicians in academia. In this sense, the IMA has accomplished its goals of broadening the view of the role of mathematicians in industry.

Follow up to the workshop include the establishment of an AWM Mentor Network hosted at the IMA website. The network connects graduate students in mathematics with established mathematicians in industry and government laboratories. A website featuring careers in mathematical science has been set up by the AWM.