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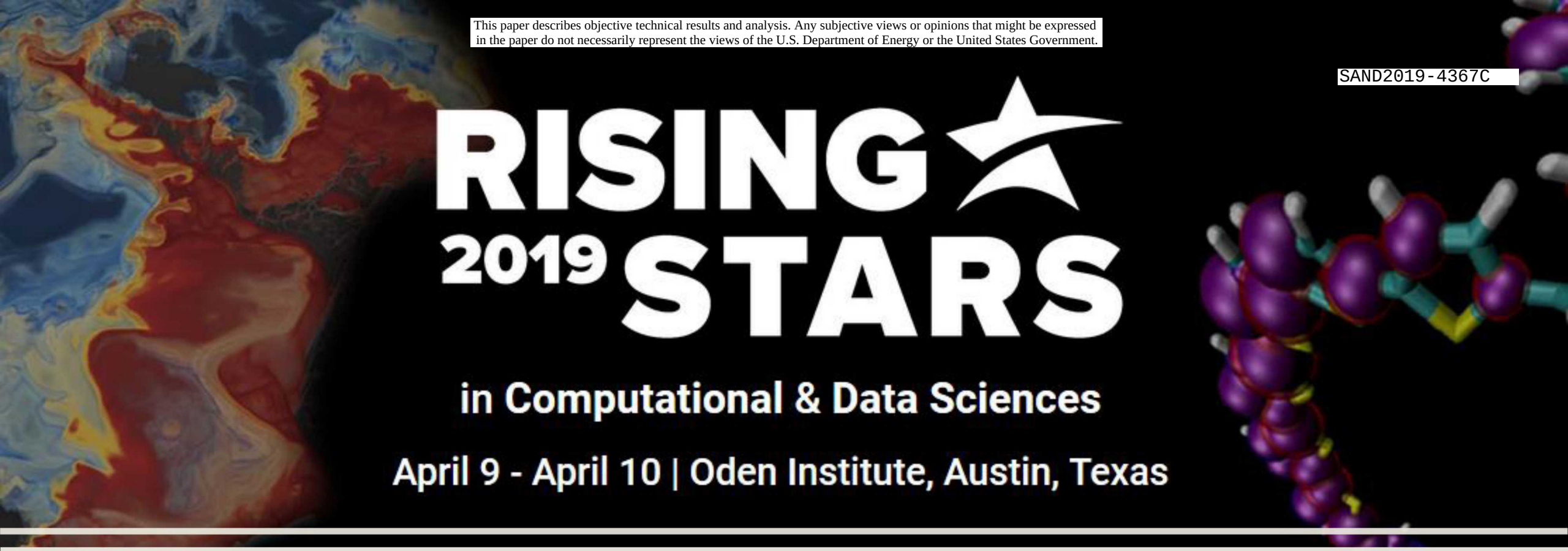

Achieving Your Potential to Become a World-Class Researcher

Tamara G. Kolda

Sandia National Laboratories

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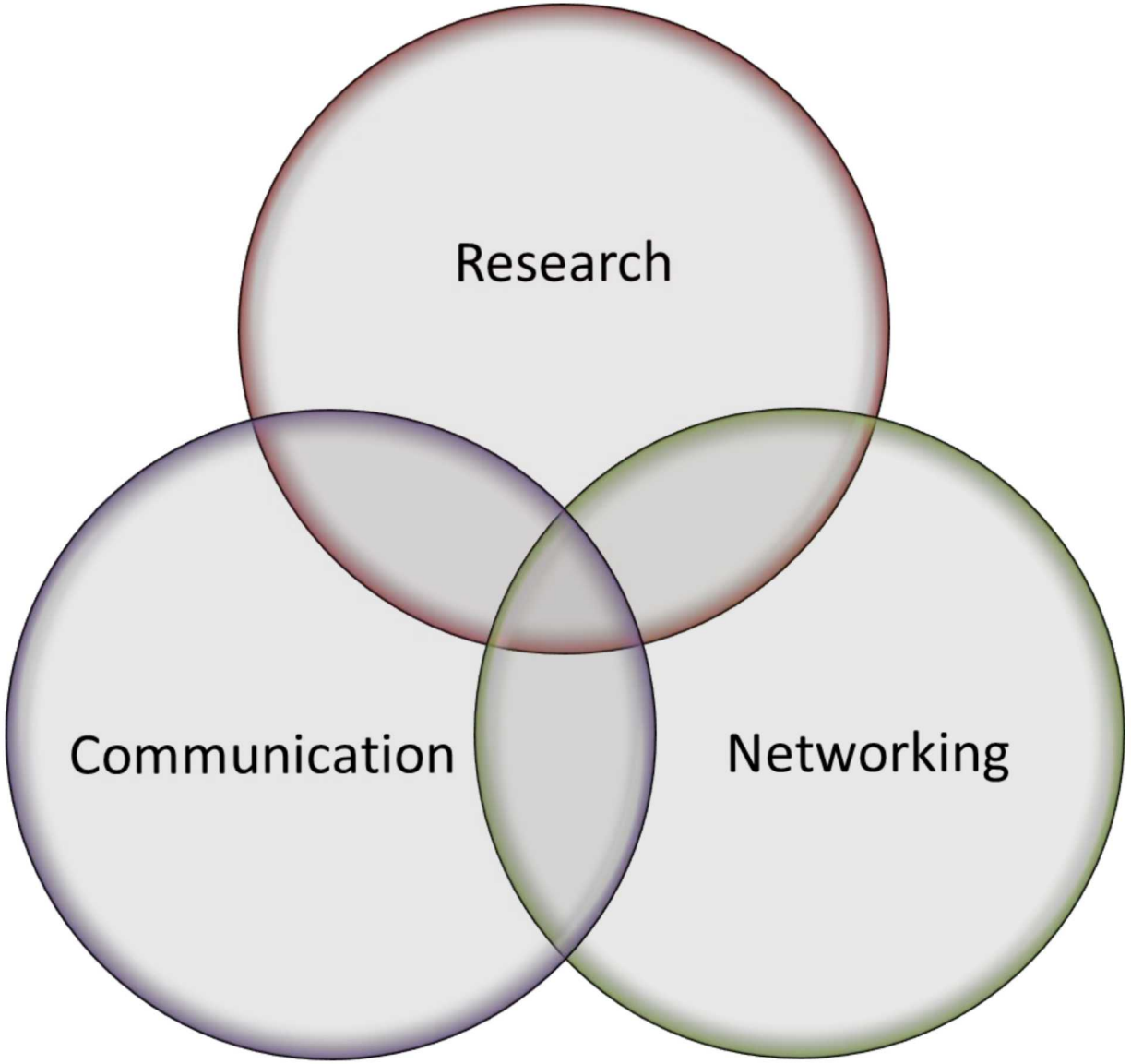
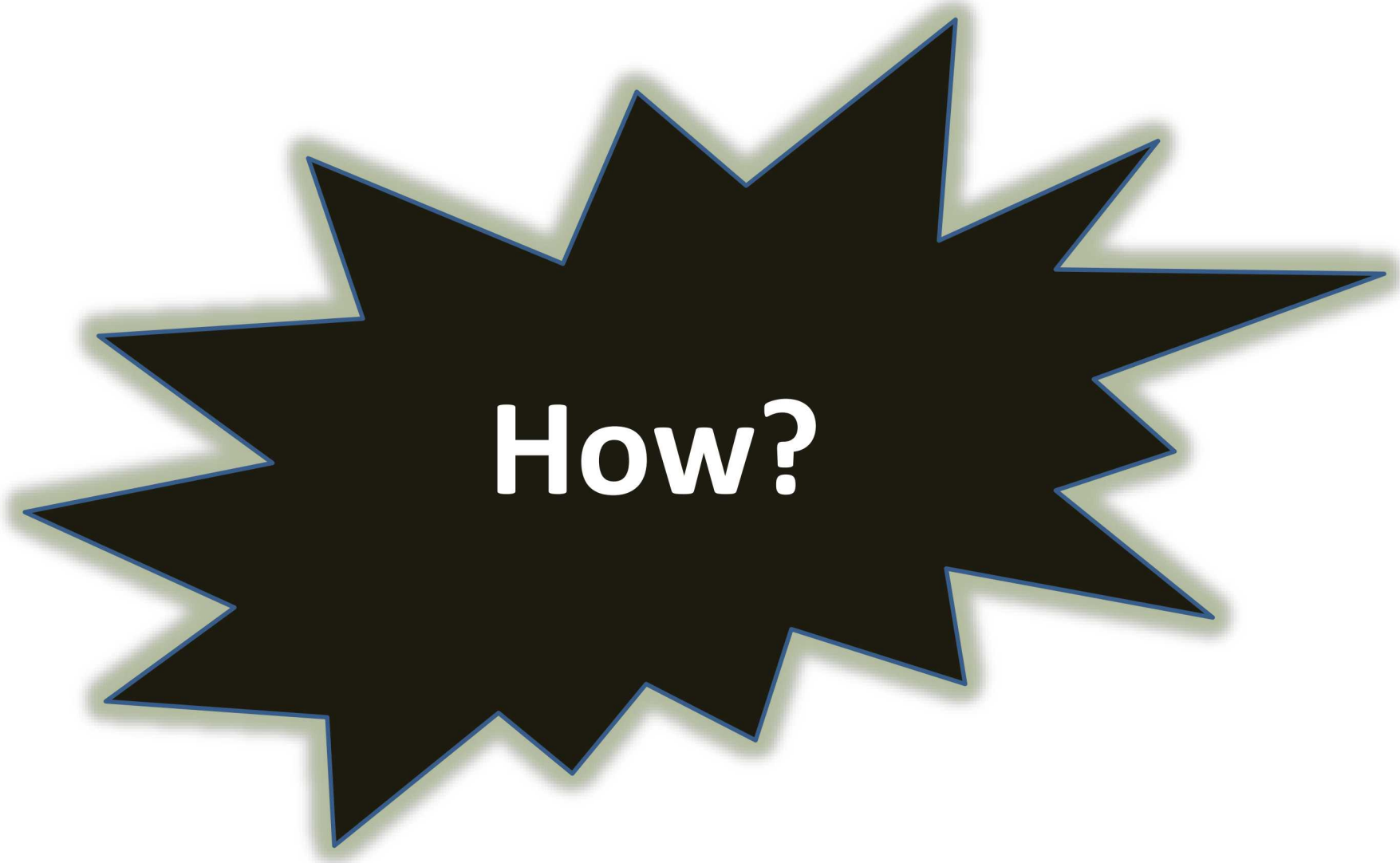

Research
Communication
Networking


bloomino

My Background

- 1992 – BS, Mathematics, Univ. Maryland, Baltimore County (UMBC)
- 1997 – PhD, Applied Mathematics, Univ. Maryland, College Park
  - Summers 1992, 1993 – National Security Agency, Ft. Meade, MD
  - Summers 1994, 1995, 1996 – Center for Computing Sciences, Bowie, MD
- 1997-1999 – Householder Postdoc, Oak Ridge National Lab
- 1999-present – Sandia National Labs, Livermore, CA
  - 2002 – Promoted (mid level)
  - 2010 – Promoted (top level)

RESEARCH


How?

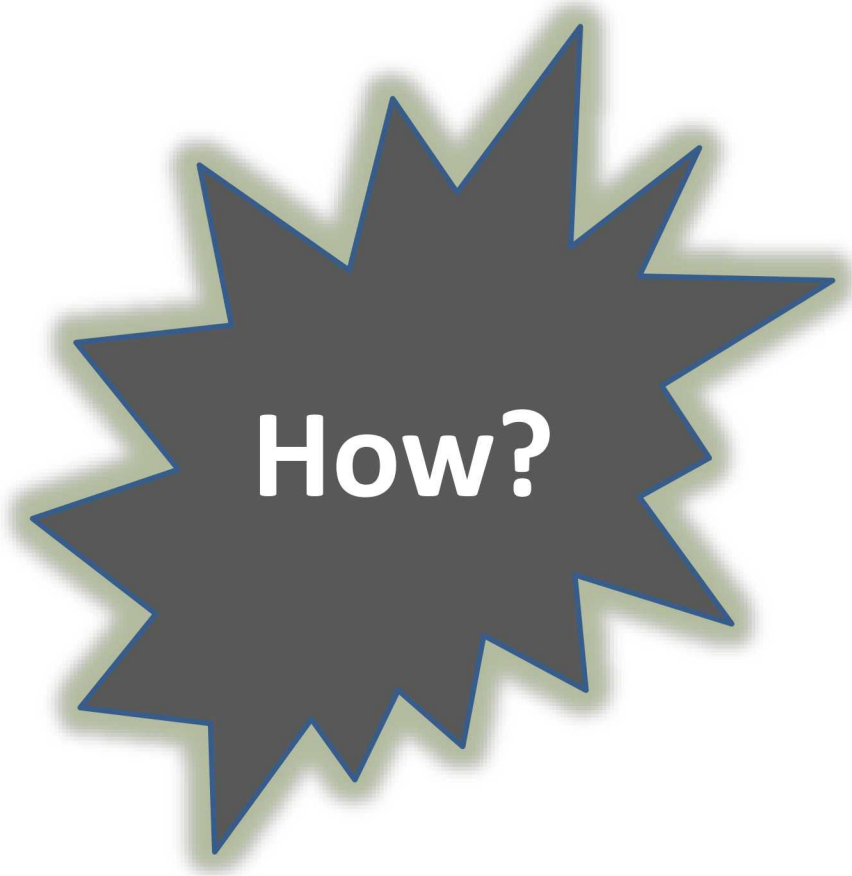

Why?

My Research History, in Brief

Thesis	Postdoc	Early years at Sandia	Mid-career at Sandia	Currently at Sandia

• Limited-memory quasi-Newton methods
• Latent semantic indexing via semi-discrete matrix decomposition
	• Graph partitioning
	• Early theory-ish results on tensor decompositions
		• Derivative-free optimization
		  ○ APPSPACK Software
		• Nonlinear solvers
		  ○ Trilinos
			• Tensor decompositions (for network science)
			  ○ Tensor Toolbox for MATLAB
			• Massive graph algorithms and models
			• Tensor eigenvalues
				• Tensor decompositions
				  ○ Generalized
				  ○ Streaming
				  ○ Higher-order moments
				  ○ Randomized
				  ○ Parallelized


Why?


How?

Selling Research

How is this work going to change the world?

- Cure cancer
- Stop global warmingb
- End terrorism

Set research goals that are

- Innovative but straightforward
- Difficult but with a reasonable chance of sucess
- **Likely impossible but worth attempting (moon shot)**

Of all the people in the world, why you?

- Extensive expertise
- **Unique expertise**

COMMUNICATION

Promoting You and Your Work

Personal Web Page

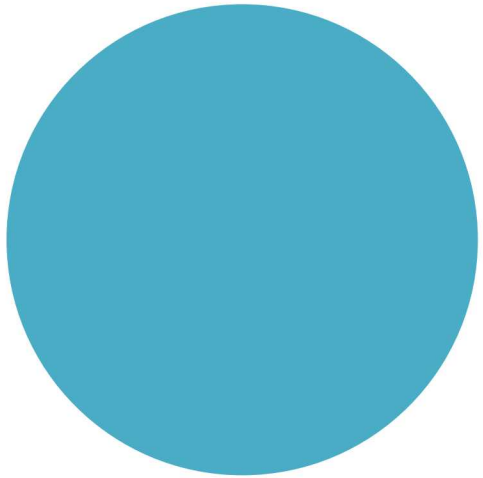
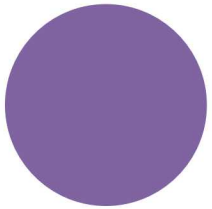
- Summary of how awesome you are!
- Keep content simple and maintain it

Research Talk

- What should the audience take away?
- Advertisement for particular paper
- Advertisement for you!

Paper

- Most people read only introduction carefully
- Explain context and contribution up front

NETWORKING

It’s Not What You Know But Who You Know

Maybe more important, it’s *who knows you*

Why is a professional network important?

Letters of Recommendation	Job Leads	Research Collaborators	Mentors	Refereeing Invitations
Speaker Invites	Elected Office Nomination	Patrons	Proposal “Support”	Prize Nominations
Editor Appointments	Keynote Speaker Invitations	Conference Co-chair Invites	Committee Appointments	Influencing Future Research Agendas

Actively Building Your Network

Conferences

Actively expand your network at conferences, workshops, meetings, etc.

Visitors

Get on the schedules of visitors to your university

Organizing

Organize minisymposia, workshops, speaker series, etc.

- Invite the major researchers in your area
- Arrange a meal with the people you invite

Creating a New Link in Your Network

Leaving a lasting first impression…

- Give your full name and institution
- Provide “links” to establish your credentials, e.g., your advisor
- Give context for your interest, i.e., what do you work on
- Ask a question, e.g., about a research question they might have expertise on or one of their papers or talks

Memory hacking 101

- Follow up with an email after 1 week (not sooner, not later)
- Remind them of the above plus the context of the conversation
- Send any follow up papers, thoughts, or just your contact info

Rinse and repeat…

Everything Else…

Celebrating Rejection & Failure

Weirdnesses

WWMWD?

TK MW

- 2000 Joint Mathematics Meetings, Margaret Wright was the Emmy Noether Lecturer
- **Picture from AMS-AWM-SIAM Special Session on Linear Algebra and Optimization**
- From left to right: Yuying Li (Cornell), Tamara Kolda (Sandia National Labs), Ilse Ipsen (North Carolina State Univ), Virginia Torczon (William & Mary), Margaret Wright (2000 Emmy Noether Lecturer and Session Organizer, Bell Labs), Jane Cullum (Los Alamos National Lab), Niloufer Mackey (Western Michigan Univ.), Anne Greenbaum (Univ. Washington), Dianne O'Leary (Session Organizer, Maryland), Misha Kilmer (Tufts Univ.)

Resources

- *What Works for Women at Work* by Joan C. Williams and Rachel Dempsey
- *Influence: The Psychology of Persuasion* by Robert B. Cialdini
- *A PhD Is Not Enough: A Guide To Survival In Science* by Peter J. Feibelman
- Richard Hamming, You and your Research, 1995 (also YouTube video)
- *The illustrated guide to a PhD* by Matt Might