

DARPA/DSO 101

Dr. Valerie Browning
Director
Defense Sciences Office

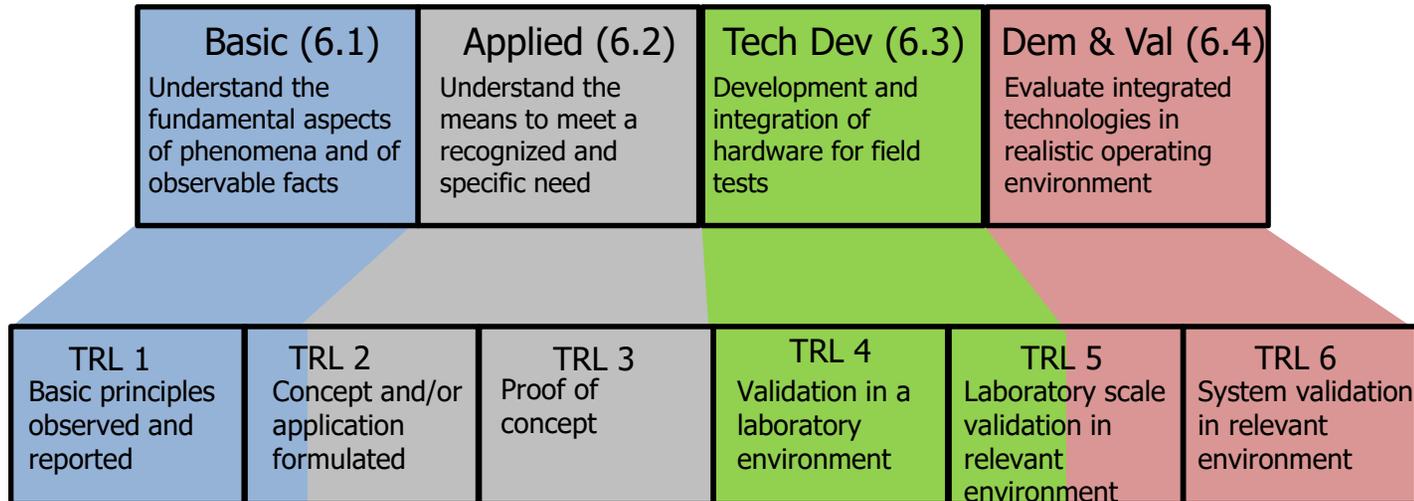
March 2018





DoD Research & Development related to Technology Readiness Level (TRL)

- DARPA's funding primarily falls into basic, applied and technology development categories
- Efforts range from proof of concept to technology demonstration





DARPA Technical Offices





DARPA – Community Engagement

Stellar program managers (PMs)

Technology leadership

Adventurous spirit

Conviction and drive to change the world

Discussions

- Emails, conferences, visits with PM
- Exchange of ideas/concepts
- Often precursor to seedling

Seedlings

- Usually through an Office-Wide BAA
- Small, short duration (6-9 months)
- Move from “disbelief” to “mere doubt”
- May lead to the next generation ideas

Programs

- Specific program BAAs
- Often multi-year, multi-disciplinary
- Move from “possibility” to “capability”

Robust technology community

Universities

Labs

Companies small and large

Military services and agencies

DARPA Culture

Off-scale impact

Risk taking

Honor in public service

Heilmeier Catechism



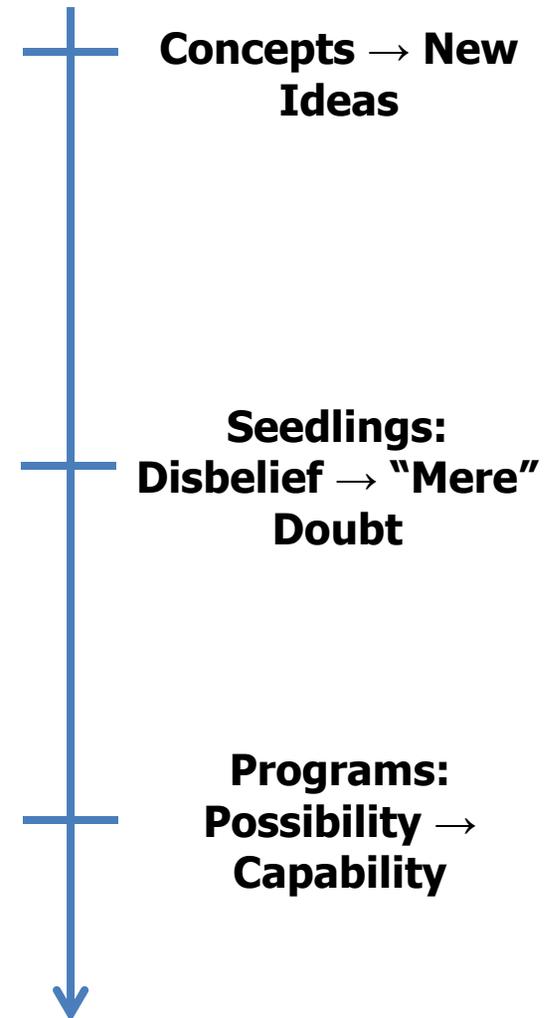
Three Ways to Engage with DARPA

Talk to a Program Manager (PM)

- Email/phone/face to face throughout the year

Submit ideas to an Office-Wide BAA

Respond to DARPA program BAAs





DSO Outreach Efforts

- Young Faculty Award (YFA) program aims to identify and engage **rising stars** in junior faculty positions

The YFA program provides:

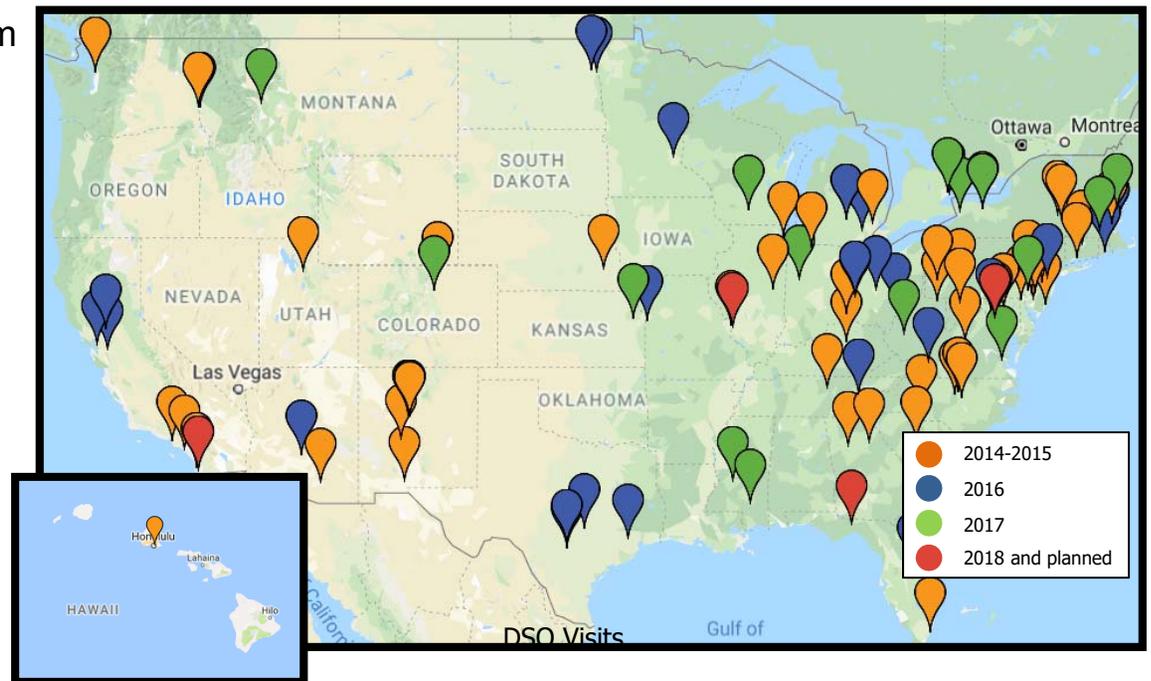
- Research funding
- DoD contacts
- Military visits/exercises
- PM Mentor

The YFA program yields:

- Insight into DoD problems
- Novel ideas
- Career development
- Future DARPA performers



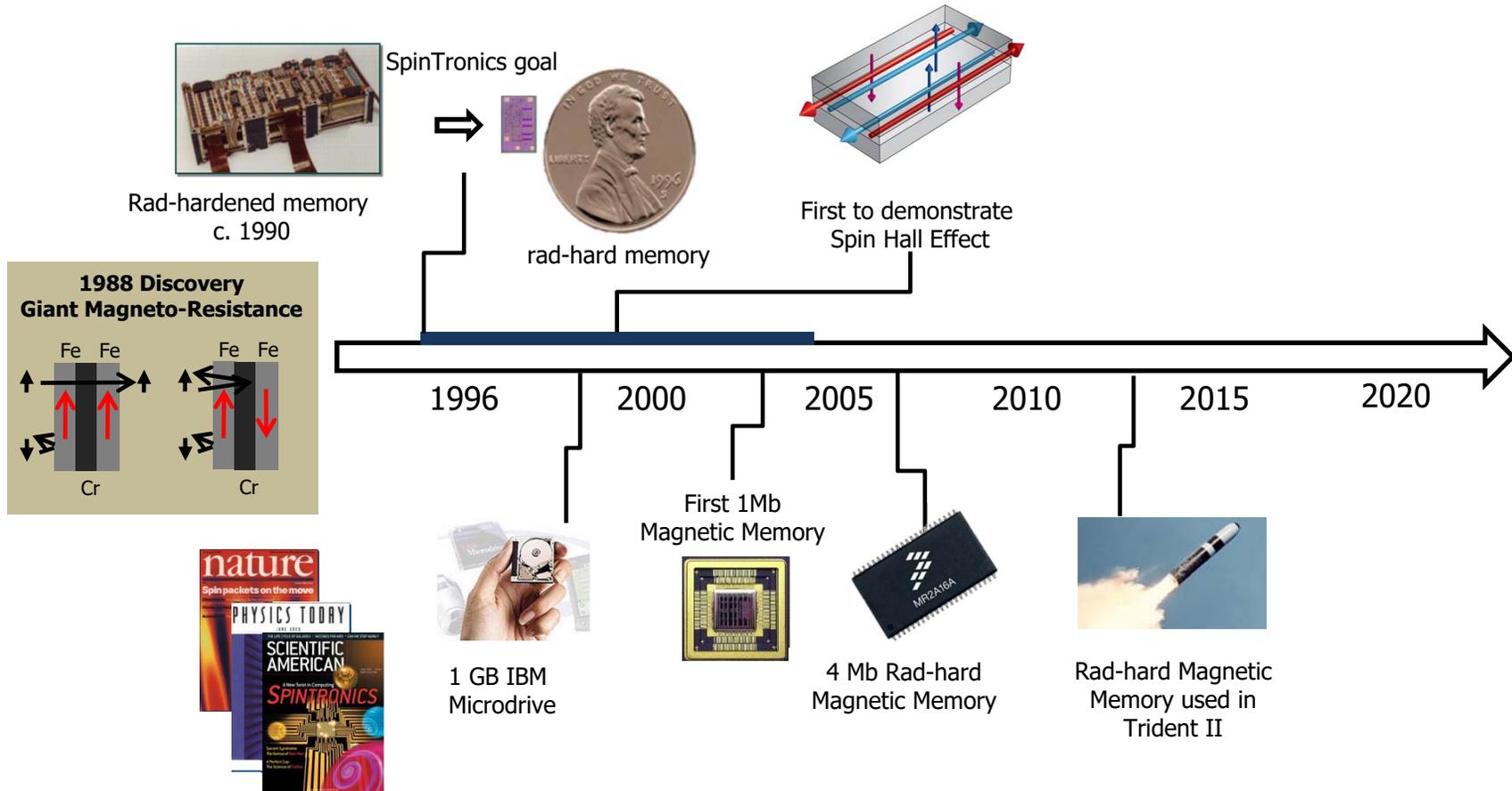
- Multiple outreach activities help inform the academic community regarding the DARPA mission
- BAA solicitations provide conduit for researchers to share their ideas with DARPA PMs
- Constant Contact used to notify broader community when BAAs, RFI, and SNs are released.
- There are 5K active contacts (66 HBCU/MIs)
- [DSO Constant Contact](http://www.darpa.mil/work-with-us/interact-with-DSO) at <http://www.darpa.mil/work-with-us/interact-with-DSO>





Example DSO Success Story: SpinTronics

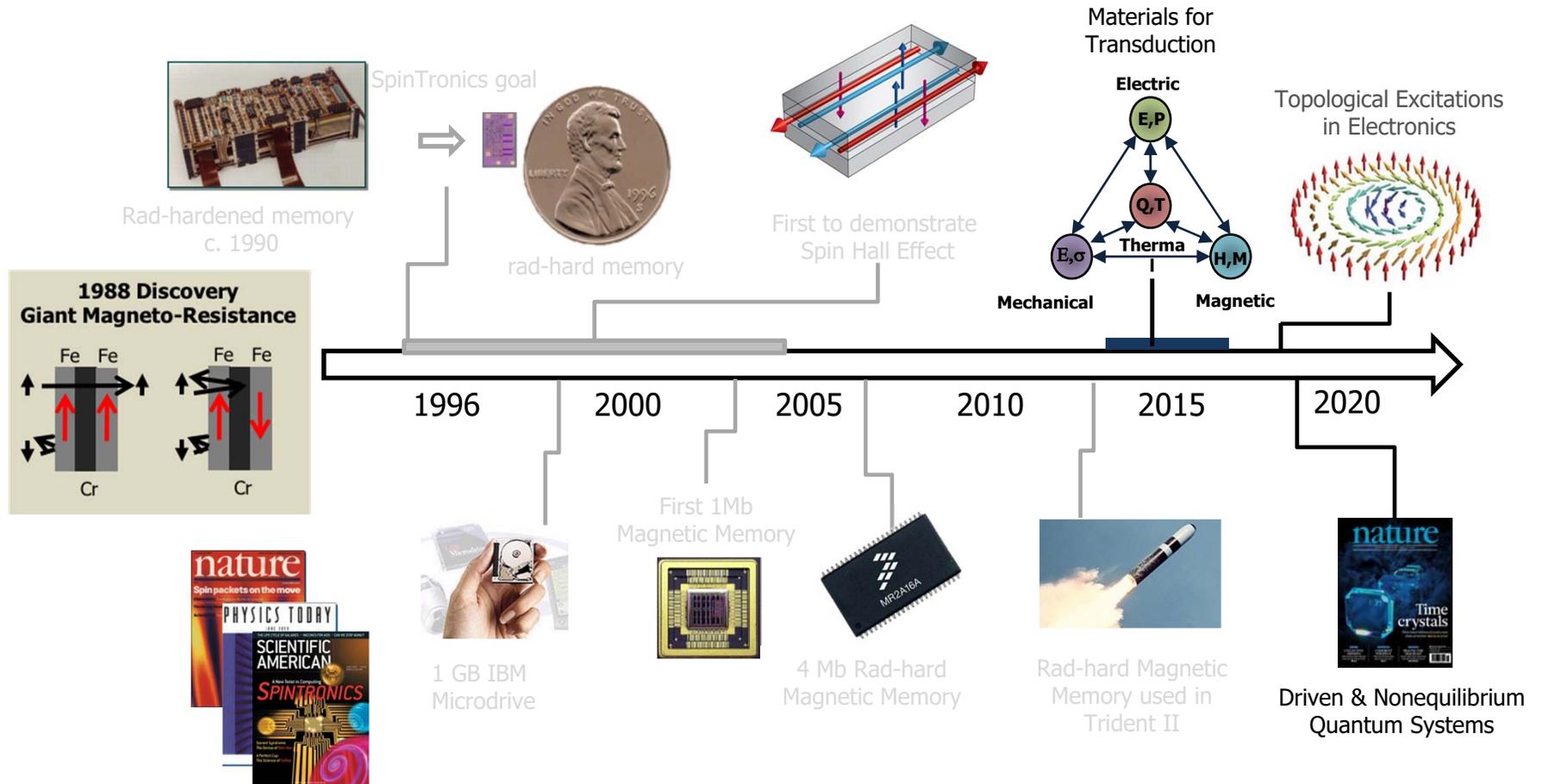
Can electron spin be used for logic & memory devices?





SpinTronics Today

Can electron spin be used for logic & memory devices?





Exemplar DSO Interest Areas

- Alternative computing
 - Can we develop new computational primitives for modeling & simulating complex systems?
- Fundamental limits of machine learning
 - Can we explore and develop new learning approaches to model dynamic systems?
- Managing complexity and uncertainty in design
 - Can we develop new representations to enable complex design-space exploration?
- New sensing modalities
 - Can we develop new sensors to "see" through clutter and/or find hidden objects?
- Predictive social behavioral models
 - Can we use artificial simulations to validate social science modeling methods?
- Detection and/or deterrence of WMD/WMT threats
 - Can we develop scalable and affordable sensing technologies/networks to protect areas from chemical, biological, radiological, nuclear and explosive threats?



Revolutionary vs. Evolutionary R&D

“The flying machine which will really fly might be evolved by the combined and continuous efforts of mathematicians and mechanics in from one million to ten million years”

- The New York Times
 - 9 October 1903

“We started assembly today”

- Orville Wright’s Diary
 - 9 October 1903





Questions