DARPA I2O Demystified

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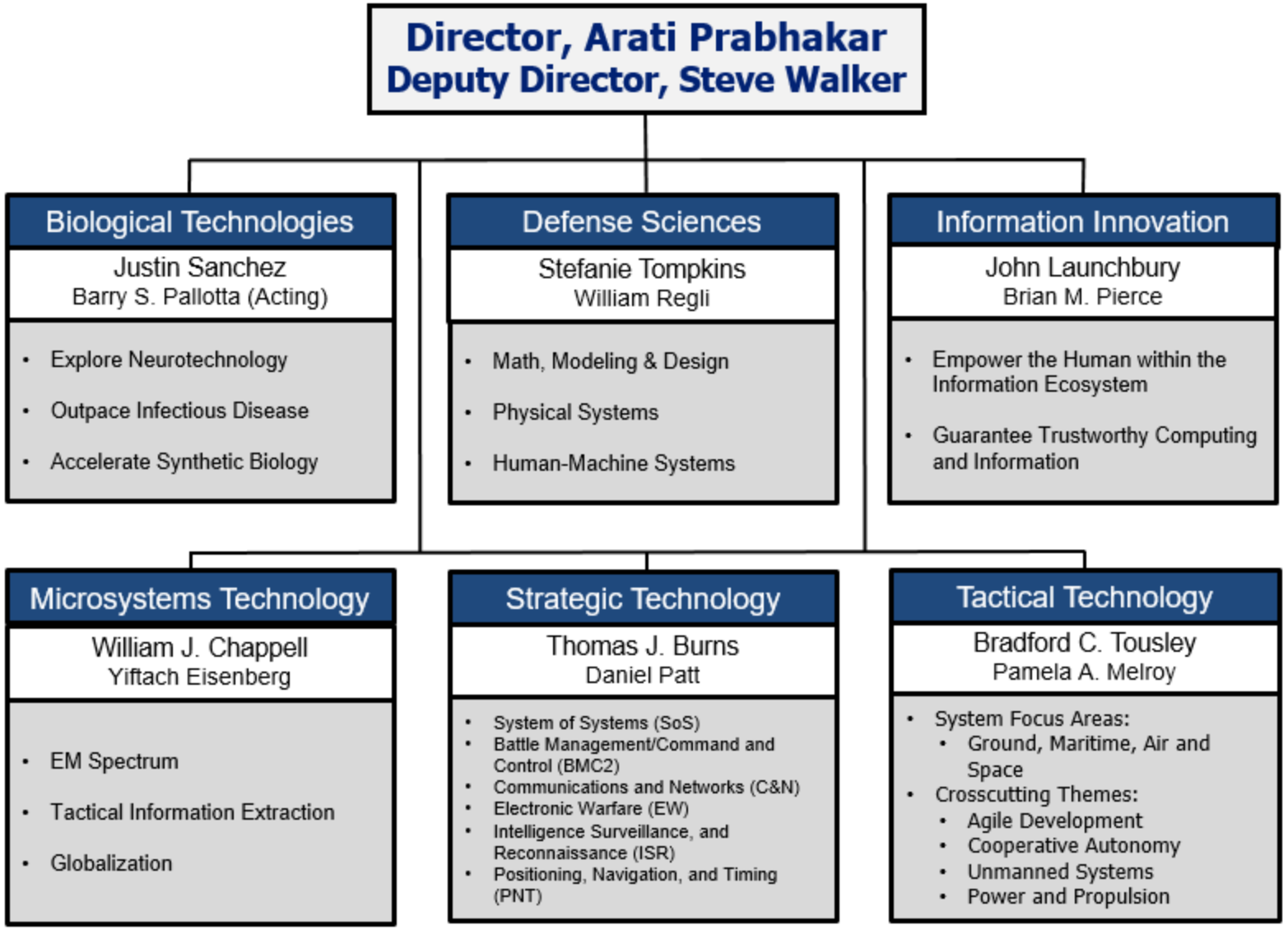
Briefing Prepared for NSF SaTC 2017 PI Meeting

January 2017

A bit about myself

- Professor at Columbia University since 2001
- Served as Program Director for NSF/SaTC (AY2013)
- DARPA I2O Program Manager
  - IPA since July 2014
  - Conceived and launched 3 new programs, managing/managed 4 others
- Why?
  - Learn about actual problems and technology gaps through direct observation
  - Public service
  - Access, resources, flexibility: pick all three
  - Impact

DARPA Technical Offices



I2O Strategic Thrusts

CYBER: Win at cyber

ANALYTICS: Understand the world

SYMBIOSIS: Partner with machines

Win at cyber

Harden systems against cyber attack (build in security)

Operate through cyber attacks (manage insecurity)

Win in the cyber domain (plan and act)

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Win in the cyber domain (plan and act)

- High Assurance Cyber Military Systems (HACMS)
- Vetting Commodity IT Software and Firmware (VET)
- Cyber Grand Challenge
- Space/Time Analysis for Cybersecurity (STAC)
- Mining and Understanding Software Enclaves (MUSE)
- Active Authentication (AA)
- Clean-slate design of Resilient, Adaptive, Secure Hosts (CRASH)
- Dispersed Computing
- SafeWare
- Leveraging the Analog Domain for Security (LADS)

Win at cyber

Harden systems against cyber attack (build in security)

Operate through cyber attacks (manage insecurity)

Win in the cyber domain (plan and act)

- Extreme DDOS Defense (XD3)
- Edge-Directed Cyber technologies (EdgeCT)
- Mission-Oriented Resilient Clouds (MRC)
- Cyber Fault-tolerant Attack Recovery (CFAR)
- Rapid Attack Detection, Isolation and Characterization Systems (RADICS)
- Building Resource Adaptive Software Systems (BRASS)

Win at cyber

Harden systems against cyber attack (build in security)

Operate through cyber attacks (manage insecurity)

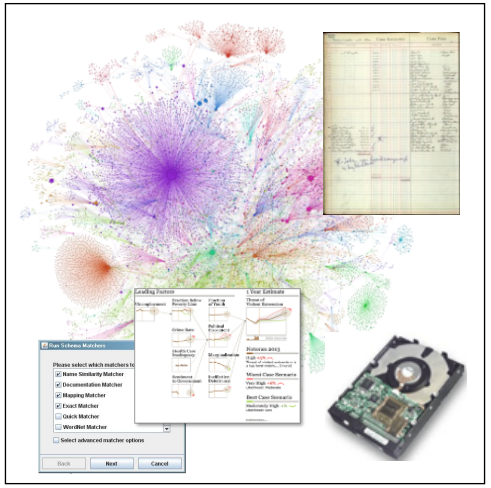
Win in the cyber domain (plan and act)

- Plan X
- Network Defense
- Transparent Computing (TC)
- Enhanced Attribution (EA)
- Active Cyber Defense (ACD)
- Anomaly Detection at Multiple Scales (ADAMS)

Analytics: Understand the world

Make sense of data
(create reliable information)

Build holistic system-level understanding
(integrate information fragments)



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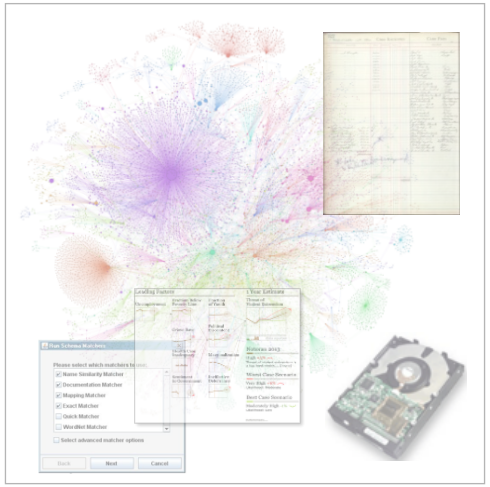

- Broad Operational Language Translation (BOLT)
- Deep Exploration and Filtering of Text (DEFT)
- Low Resource Languages for Emergent Incidents (LORELEI)
- Robust Automatic Transcription of Speech (RATS)
- Media Forensics (MediFor)

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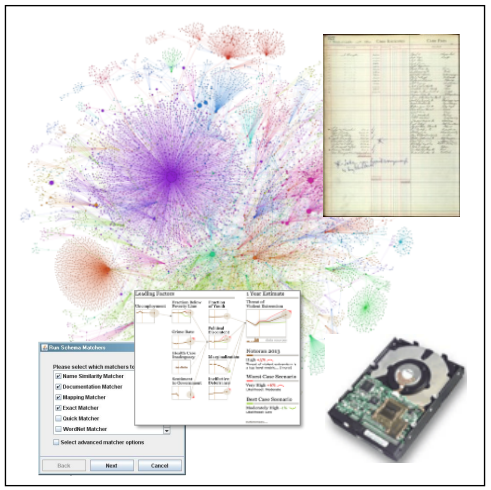
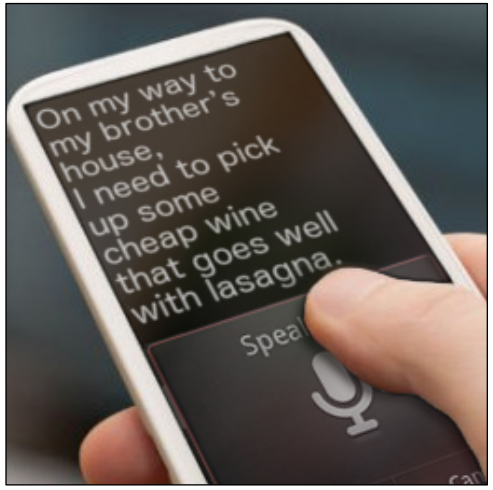


- XDATA
- Memex
- Insight
- Quantitative Crisis Response (QCR)
- Brandeis
- Modeling Adversarial Activity (MAA)
- Big Mechanism
- Data-Driven Discovery of Models (D3M)
- Synergistic Discovery and Design (SD2)
- Causal Exploration
- World Modelers

Symbiosis

Partner with machines
(drive contextual AI technologies)



- Explainable AI
- Probabilistic Programming for Advancing Machine Learning (PPAML)
- Communicating with Computers

DARPA Programs

- Problem-focused
  - THINK BIG
  - Research is needed to solve the problem, but not the reason for the program
  - Once approved, Program Manager has great discretion on execution

- Three usual types
  - 6.1: Fundamental Research – closest to NSF programs in outlook; grants possible but rare
  - 6.2: Basic Research – prototype/concrete deliverable expected; contracts the norm
  - Grand Challenges

- BAA/program process
  - Public notification; Industry Day; Abstracts*; Proposals; Award Notification; Feedback*; Contracting; Kickoff; PI meetings and site visits; Programmatic Evaluations; Program Reviews; **Transition**

- Other funding opportunities
  - SBIRs/STTRs
  - Seedlings

Interacting with DARPA

- "I have a good idea, how do I get funding to develop it?"
- Meet with the PM
  - Pre- vs. post-BAA announcement
- Pay attention to DARPA notifications (Special Notice or BAA)
  - Website, Twitter, FedBizOpps (fbo.gov)
- Attend Proposer/Industry Days

Frequently Asked Questions

- "Aren't most programs classified anyway?"
- "Aren't there publication restrictions?"
- "Do I need to partner with a {company, defense contractor, university}?"
- "What should my budget be?"
- "Am I expected to collaborate with other program performers?"