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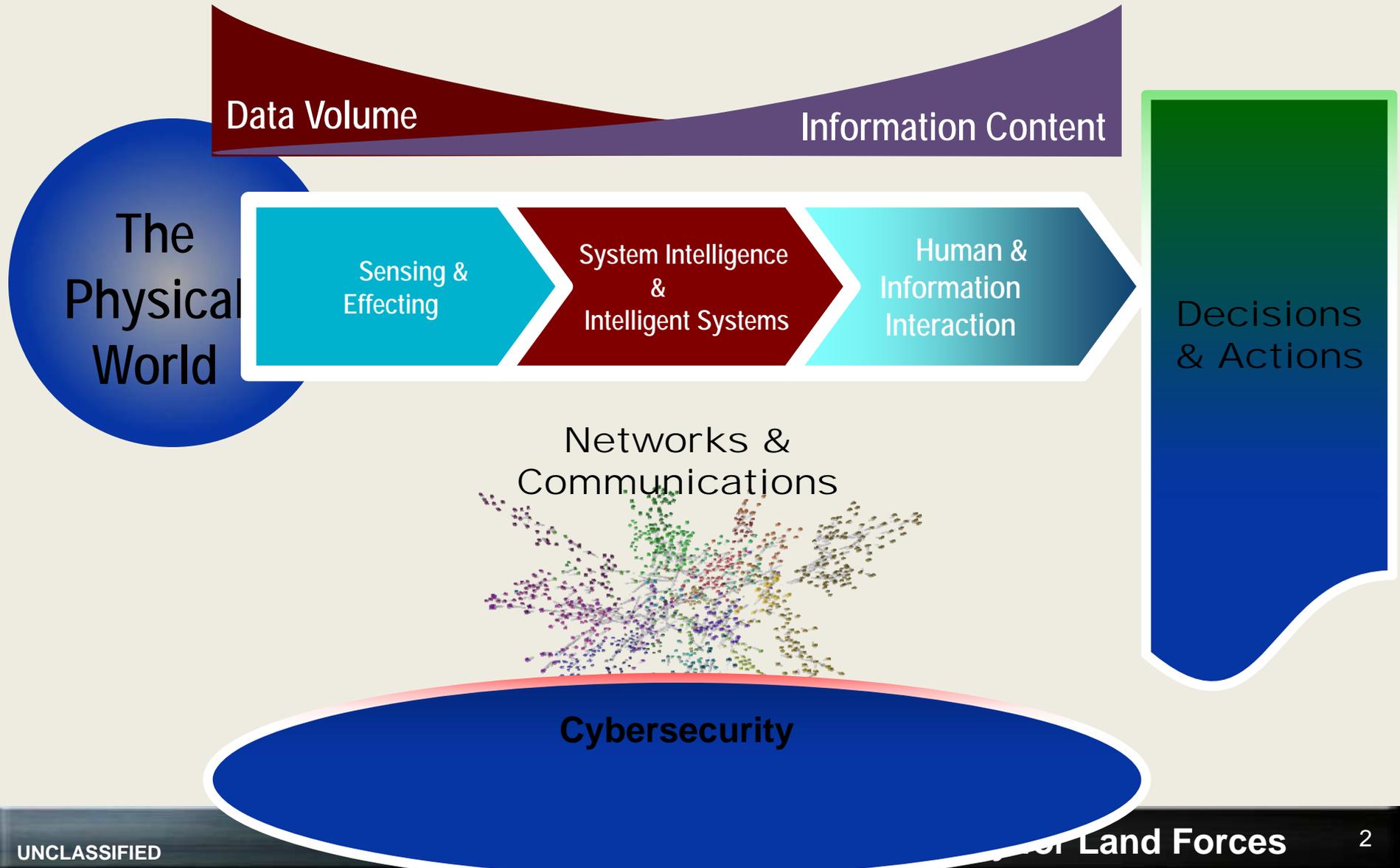
**Dr. Alexander Kott**  
**Information Sciences Campaign**  
**U.S. Army Research Laboratory**

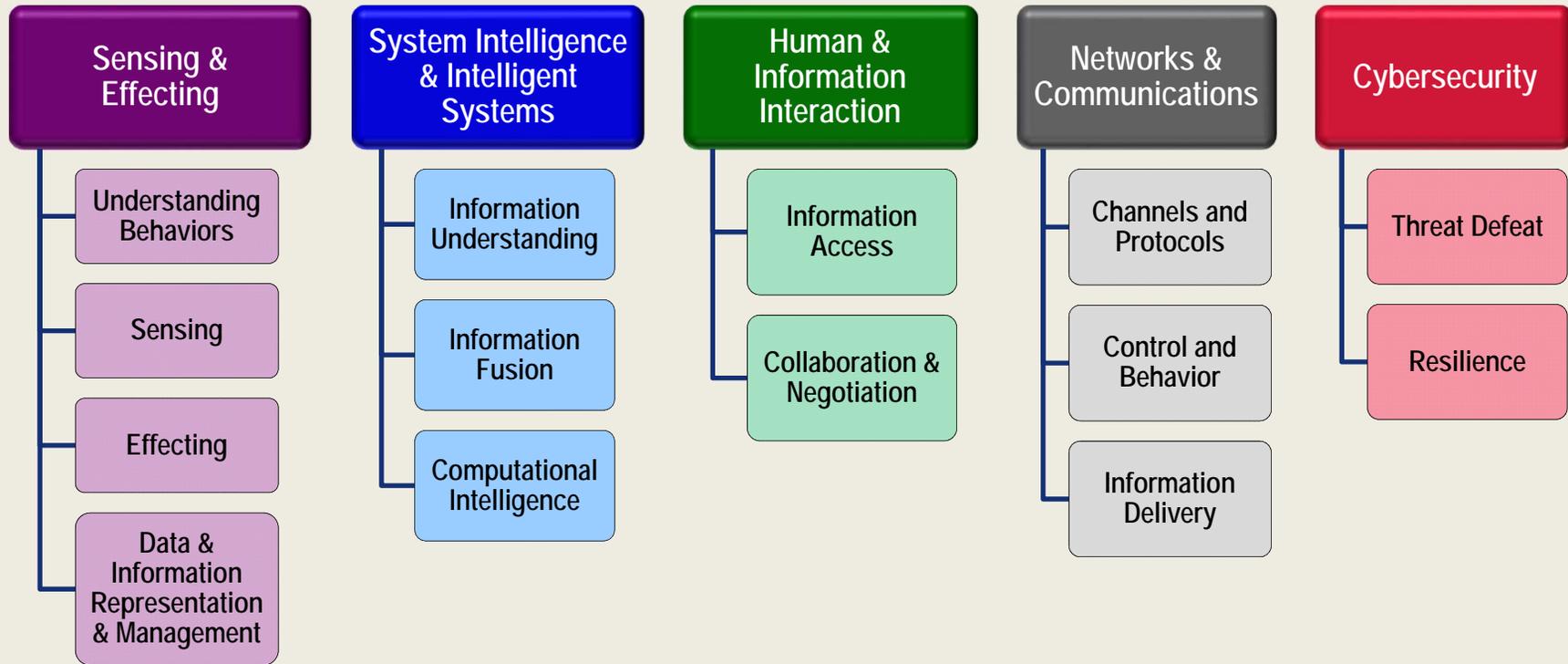
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U.S. ARMY  
**RDECOM**

# Information Sciences Campaign







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## Key Campaign Initiatives



- Sensing and Information Fusion for Advanced Indications and Warnings
- Acting Intelligently in a Dynamic Battlefield of Information, Agents, and Humans
- Taming the Flash-Floods of Networked Battlefield Information
- Cyber Fire and Maneuver in Tactical Battle



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## ARL People and Expertise



**ARL has over 200 Scientists and Engineers engaged in Information Sciences, including nationally recognized leaders in:**

- Sensing, networking, and autonomous systems
- Signal and image processing
- Microscale meteorology
- Energy efficient communications and networks
- Machine translation
- Social network analysis and field experimentation
- Information-based decision and trust in networks
- Machine learning in cyber defense

***Collaboration Opportunities:***

Cyber Defense

Intelligent Systems

Natural Language Processing

Quantum Information

*Plus topics covered in 36 posters ...*

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# Information Sciences Campaign

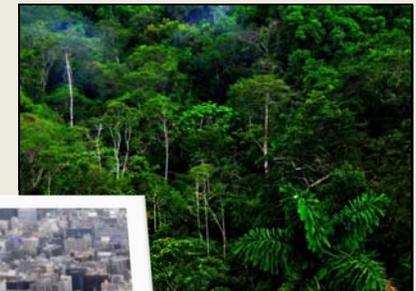


## Vision:

*Information supremacy to limit tactical surprise and improve situational awareness in complex, contested environments.*

## Some Army Needs Related to Information Sciences:

- Information, Surveillance, Reconnaissance – Decision Making and information Sharing in Hostile Environments:
  - Tunnels and Subterranean Operations
  - Megacities and Humanitarian Operations
  - Jungles and Triple Canopy
- Communication in Bandwidth Constrained & Denied Environments





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## ARL Infrastructure and Facilities



- Network Science Research Lab (NSRL)
- Cognitive Networking, Communications & Protocols Laboratory (CNCPL)
- Quantum Network Protocols and Algorithms Laboratory (QNPAL)
- Army Cyber Research and Analytics Lab (ACAL)

- Cyber Virtual Assured Network (CyberVan)
- Tactical Information Analytics Facility
- Multilingual Computing Laboratory
- Intelligent Systems Research Center
- Aerosol Research Facility
- Data to Decisions Test Bed
- Mobile Network Modeling Institute
- Sensor Information Test Bed Collaborative Research Environment
- Atmospheric Sciences Center
- Buried Threat Experimentation Facility
- Acoustic Measurement Facility
- E-field Cage



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# ARL Open Campus Collaboration Opportunities



open  
campus

## Networks & Communications

Tactical Optical Communications	Dr. Robert Drost
Lower VHF Networking in Harsh Environments	Dr. Brian Sadler
Data-Driven Analysis of Collaboration Structure & Evolution	Dr. Terrence Moore
Wireless Networking in Resource Constrained Environments	Mr. Ron Tobin
Quality of Information (QoI) for Semantically-Adaptive Networks	Mr. Trevor Cook
Trust-based Approaches for Network Security	Dr. Jin-Hee Cho
Dynamics of Trust & Information Sharing	Dr. Kevin Chan
Mobility & Cognitive Networking in Harsh Environments	Dr. Brian Sadler

## System Intelligence & Intelligent Systems

Hybrid Training Methods for Visual Classification & Autonomous Navigation	Ms. Maggie Wigness
Context-aware Human Information Provisioning, Disassembling and Tailoring	Ms. Somiya Metu & Mr. Michael Lee
Collaborative Exploration in Human-Robot Teams	Dr. Clare Voss & Dr. Susan Hill
Semantic Information Enrichment to Engender Trust	Dr. James Michaelis
Reasoning Under Uncertainty	Dr. Doug Summer-Stay
Temporal Information Extraction	Dr. Taylor Cassidy
Trust, Influence and the Enhanced Human Performance of Multi-genre Crowd Networks	Dr. Sue Kase & Ms. Heather Roy
Autonomous Mobile Robot Exploration with an Information-Gain Metric	Dr. John Rogers
Automated Vehicle Routing	Mr. Jeffrey Johnson

## Human & Information Interaction

Software-defined and Value-based Information Processing and Dissemination in IoT Applications	Dr. James Michaelis & Dr. Mauro Tortonesi
Combining Complementary/Contradictory Information-Gain Metric	Dr. Timothy Hanratty

All Posters in the Mallette  
Training Facility Room 10 A/B

## Sensing & Effecting

Infrasonics	Dr. John Noble
Raman spectra of single trapped airborne aerosol particles & biofate study	Dr. Yongle Pan
Atmospheric Boundary Layer Modeling	Dr. Brian Reen
Atmospheric Boundary Layer Characterization	Dr. Robb Randall
Meteorological Sensor Array	Dr. Ben MacCall
High Resolution Artillery Meteorology	Dr. Jim Cogan
Cross-modal & Extended Range Face Recognition	Dr. Shuowen (Sean) Hu
Sensor, Data & Information Processing & Fusion for Situational Understanding	Dr. Tien Pham
Human Detection "in the wild"	Dr. Alex Chan
Image Super Resolution	Dr. Susan Young
Scene-Consistent Visual Saliency	Dr. Garrett Warnell

## Cyber Security

Extremely Lightweight Intrusion Detection (ELIDe)	Dr. Richard Harang
The Resilience of the Internet	Dr. Lisa Marvel
Characterizing Burstiness in Intrusion Detection	Dr. Alexander Kott
Cognitive Foundations of Cyber Analysts	Dr. Robert Erbacher
Metrics and method for efficient post-infection network triage	Dr. Richard Harang
Risk Model Roadmap from Events to Parameters	Dr. Hasan Cam

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# Questions?

