

YOUNG FACULTY AWARD

October 18, 2024

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Agenda – October 18, 2024

0915-0930 **YFA Program Overview**
Ana Saplan, YFA Program Manager, DARPA/DIRO

0930-0945 **Welcome to DARPA**

0945-1045 **DARPA Technical Offices Presentations**

- Defense Sciences Office (DSO)
- Biological Technologies Office (BTO)
- Information Innovation Office (I2O)
- Microsystems Technology Office (MTO)
- Strategic Technology Office (STO)
- Tactical Technology Office (TTO)

1045-1100 **Break**

1100-1135 **YFA Guest Presentations**

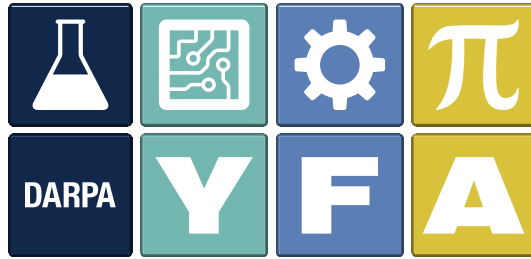
- Small Business Programs Office (SBPO)
- DARPAConnect
- DEVCOM ARL Army Research Office

1135-1235 **YFA 2022 Director's Fellowship Awardees
Lightning Presentations**

1235-1430 **Lunch Break / PM Sidebars**

1430-1700 **YFA PI Posters & Demonstrations**

1700 **Adjourn**



YFA Program Objectives

The objective of the DARPA Young Faculty Award (YFA) program is to identify and engage researchers in junior faculty positions at U.S. academic and non-profit research institutions and expose them to Department of Defense (DoD) needs and DARPA's program development process.

The YFA program provides funding, mentoring and industry and DoD contacts to awardees early in their careers so they may develop their research ideas in the context of national security needs. The long-term goal of the YFA program is to develop the next generation of academic scientists, engineers, and mathematicians who will focus a significant portion of their career on DoD and national security issues. The YFA program began in 2006, and, to date, has provided funding to 568 junior faculty.

YFA awardees receive a \$500,000 grant for two years of research, with an opportunity to be considered for an additional \$500,000 under the Director's Fellowship. The YFA program funds a wide spectrum of basic science research in areas spanning physical sciences, engineering, material science, mathematics, biology, robotics, computational social science, and neuroscience.



Technical Point of Contact

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Young Faculty Award

Poster	YFA Class	Organization	Title	PI	PM Mentor	Office
1	2023	University of Akron	Hierarchical Biocomposites with Exceptional Thermal Conductivity from Synergistic Microbial Biosynthesis	Weinan Xu	Catherine Campbell	BTO
2	2023	Northwestern University	Biocompatible Soft Batteries via Bundles of Axon-Inspired, Ionogel Composite Fibers	Ryan Truby	Catherine Campbell	BTO
3	2023	University of Michigan	Implantable Tissues with Engineered Cells to Detect and Fight Sepsis	Aaron Morris	Christopher Bettinger	BTO
4	2024	North Carolina A&T State University	Spatial-temporal Dynamics for Predictive Multiscale Models of Multi-cellular Circuit	Samuel Oliveira	Christopher Bettinger	BTO
5	2023	Arizona State University	The Role of Descending Auditory Signals in Neuronal Hyperactivity and Tinnitus	Timothy Balmer	Jean-Paul Chretien	BTO
6	2023	Boston University	Ultrathin Sorbent Coatings with Bio-inspired Multi-ligand Binding Sites for Energy-efficient Capture and Release of Carbon Dioxide	Joerg Werner	Leonard Tender	BTO
7	2023	University of Tennessee, Knoxville	Moss-Embedded Living Building Materials for Acre-scale Landscape Cooling	Hongyu Zhou	Tiffany Prest	BTO
8	2024	University of Rhode Island	Precision in Miniature: Revolutionizing MPS with Digital Acoustofluidics and Nanoscale 3D Printing	Yang Lin	Adam Willis	BTO
9	2024	The Ohio State University	Spatially resolved, non-genetic optoelectronic modulation of neuronal activities with a monolithic photoelectrode	Jinghua Li	Joeanna Arthur	BTO
10	2024	University of California San Francisco	Targeting allosteric sites for seek and destroy countermeasures for opioid poisoning	Aashish Manglik	Michael Feasel	BTO
11	2024	Yale University	Rapid Identification of Viruses And Ligands (RIVAL)	Craig Wilen	Shannon Greene	BTO
12	2022 - Director's Fellowship	University of Illinois at Urbana-Champaign	Wireless Magnetic Robot for Precise Hierarchical Control of Next-Generation Mechanotherapy for Tissue Regeneration and Injury Repair	Shelly Zhang	Jean-Paul Chretien	BTO
13	2023	University of South Carolina	Extraction of many Material Properties from Analysis of a few data rich experiments	Andrew Gross	Andrew Detor	DSO
14	2023	Northwestern University	Learning Material Properties Through High-Speed Image Acquisition During Subtractive Machining	Ian McCue	Andrew Detor	DSO
15	2023	University of Washington	Power Extraction from Mini-Magnetosphere Polarization Fields	Justin Little	Michael Nayak	DSO
16	2023	Dartmouth	Non-Reciprocal Lattices of High-Q Microwave cavities for Enhanced Magnetometry	Mattias Fitzpatrick	Mukund Vengalattore	DSO
17	2022 - Director's Fellowship	University of California, Irvine	Strongly Correlated Material Systems and Sensors	Maxim Shcherbakov	Mukund Vengalattore	DSO
18	2023	University of California, Irvine	Wireless, self-powered, triboelectric-nanogenerator-resonance force sensing array	Rahim Esfandypour	Sunil Bhawe	DSO

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19	2024	Stanford University	Embodied Structural Computing for Real-Time Stiffness Adaptation	Maria Sakovsky	Andrew Detor	DSO
20	2024	University of Michigan	EMI-resilient nonvolatile memory using oxygen ion devices	Yiyang Li	Keith Whitener	DSO
21	2024	Rochester Institute of Technology	Osmotic Signalers for Functional Materials	Jairo Alberto Diaz Amaya	Keith Whitener	DSO
22	2024	Northwestern University	Coherent Levitation of Macroscopic Sensors	Mahdi Hosseini	Sunil Bhave	DSO
23	2024	Georgia Tech Research Corporation	Squid-Inspired Nozzles for Enhanced Efficiency and Thrust in Rotary Propulsors	Saad Bhamla	Susan Swithenbank	DSO
24	2024	University of Kentucky	Converting underwater noise pollution into electricity: Acoustic sensors to make informed decisions for unmanned underwater vehicles	Alexandra Paterson	Susan Swithenbank	DSO
25	2024	Regents of the University of Michigan	Authenticity Markers in Artist-Robot Interaction	Patricia Alves-Oliveira	Thomas Schenkel	DSO
26	2024	University of Maryland College Park	Theoretical and Algorithmic Foundation of Interpretable Reinforcement Learning for Intelligent Computation and Modeling	Haizhao Yang	Yannis Kevrekidis	DSO
27	2024	University of Massachusetts Amherst	Deep Learning for Discovering Optimal, Synthesizable Inorganic Porous Materials	Peng Bai	Yannis Kevrekidis	DSO
28	2022 - Director's Fellowship	Massachusetts Institute of Technology	Mechanical Neuromorphic Metamaterials for Multifunctional Nanosystems	Farnaz Niroui	Vishnu Sundaresan	DSO
29	2024	Harvard University	Characterizing and Mitigating Adversarial Impacts on Multiagent Reinforcement Learning	Stephanie Gil	Nathaniel Bastian	I2O
30	2023	Yale University	μ MAS: Micro-Macro Hardware-Algorithm Architecture Search for Edge Efficiency	Priyadarshini Panda	Howard Shrobe	I2O
31	2023	Northeastern University	Nano-Watt Power Machine-Learning Hardware using Precision Analog Computing	Aatmesh Shrivastava	Howard Shrobe	I2O
32	2023	Columbia University	Causal Reinforcement Learning (CRL): Decisions, Explanations, and Generalizations	Elias Bareinboim	Howard Shrobe	I2O
33	2023	SRI International	Vehicular Reconfiguration and Rapid Repairs for Remote, Outlying Operations using ML (VRRRRROOM)	Shon Cook	John-Francis Mergen	I2O
34	2023	Duke University	Runtime Identification of Detrimental Augmented Reality (AR) Experiences through AR-specific Quality of Experience (QoE) Modeling and Monitoring	Maria Gorlatova	Matthew Wilding	I2O
35	2023	University of Illinois at Urbana-Champaign	Relation Learning for Proof Automation - PRICELESS	Talia Ringer	Alvaro Velasquez	I2O
36	2024	Ohio State University	Decentralized Sequential Decision Making in the Data-Limited Regime: A Self-Supervised Pretrained Foundation Model Approach	Jia (Kevin) Liu	Alvaro Velasquez	I2O
37	2024	Cornell University	Decentralized Online Parameter-Efficient Fine-Tuning of Compressed Models	Christopher De Sa	Alvaro Velasquez	I2O





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38	2024	University of Wisconsin	Active Adaptation for Decentralized Foundation Models	Frederic Sala	Alvaro Velasquez	I2O
39	2024	University of California San Diego	Grounding LLMs with Physical Laws	Rose Yu	Erica Briscoe	I2O
40	2024	University of Illinois at Urbana Champaign	Language and Hardware Adaptive Representations and Techniques for Compiling Heterogeneous Workloads	Thirimadura Charith Mendis	Howard Shrobe	I2O
41	2024	Stanford University	A Fast Design Space Exploration Framework and Compiler for Heterogeneous Systems with Neural Network Accelerators	Priyanka Raina	Howard Shrobe	I2O
42	2024	Brown University	Discovering and Controlling Emergent Symbolic Mechanisms in Neural Networks	Ellie Pavlick	Matthew Marge	I2O
43	2024	University of Missouri	Towards Adaptable and Socially Intelligent Reinforcement Learning	Mushuang Liu	Victoria Romero	I2O
44	2022 - Director's Fellowship	University of Massachusetts Amherst	Towards Theoretical Foundations for Information Controls	Amir Houmansadr	Mike Lack	I2O
45	2022 - Director's Fellowship	Arizona State University	Shining Light on Occluded Vulnerabilities	Yan Shoshitaishvili	Allison Kline	I2O
46	2022 - Director's Fellowship	Johns Hopkins University	Abstract Modeling of Control- and Data-flow Guards of Inactive Vulnerabilities via Symbolic Object Graph	Yinzhi Cao	Allison Kline	I2O
47	2022 - Director's Fellowship	University of California, Riverside	Information and Vulnerability Flow Type Systems	Mohsen Lesani	Matthew Wilding	I2O
48	2023	Iowa State University	Aerosol Jet Printing of Bespoke Low-Loss Electronics with Nanocomposite Dielectrics	Ethan Secor	Bryan Jacobs	MTO
49	2023	University of California, Irvine	Hyperdimensional Computing for Robust and Efficient Cognitive Learning	Mohsen Imani	Bryan Jacobs	MTO
50	2023	University of Arizona	Reconfigurable Single Chip Radio Frequency Signal Processor Architecture Search for Edge Efficiency	Matt Eichenfield	Justin Cohen	MTO
51	2023	Northeastern University	Compound Semiconductor on Piezoelectric Strongly Confined Microacoustic Integrated Circuits (COSMIC) for RF Signal Processing	Siddhartha Ghosh	Justin Cohen	MTO
52	2023	California Institute of Technology	Few-optical-cycle nonlinear nanophotonic circuits	Alireza Marandi	Justin Cohen	MTO
53	2023	Harvard University	Integrated femtosecond pulse synthesizer	Kiyoul Yang	Justin Cohen	MTO
54	2023	University of Southern California	On-chip electrical synthesis of few-cycle light via optical frequency comb	Mengjie Yu	Justin Cohen	MTO
55	2023	University of Rochester	Contact-free travelling-wave Optomechanics for Acoustic Material Spectroscopy	William Renninger	Justin Cohen	MTO
56	2024	California Institute of Technology	Cascaded Thin-Film Lithium Niobate Photonic Circuits Create Entangled Photon Triplets	Scott Cushing	Justin Cohen	MTO

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57	2023	Cornell University	Transient Nanoscale Temperature Mapping of Active RF Devices	Zhiting Tian	Yogendra Joshi	MTO
58	2023	University of North Texas	Exploring thermal properties of nanoscale wide bandgap semiconductors via ultrafast thermal-emission spectroscopy	Yuzhe Xiao	Yogendra Joshi	MTO
59	2023	University of Texas at Dallas	Designing Flow-Separation Evaporative Cooling for 3D Heterogeneous Microsystems	Xianming Dai	Yogendra Joshi	MTO
60	2024	University of Minnesota, Twin Cities	Ultralightweight Nanophotonic Radiators for Adaptive and High-Power Heat Rejection	Ognjen Ilic	Yogendra Joshi	MTO
61	2024	University of Massachusetts, Amherst	Metalens-Imaged Optical Coupler Arrays	Amir Arbabi	Anna Tauke-Pedretti	MTO
62	2024	Ohio State University	End-to-End Modeling and Mitigation of Fault Injection Attacks	Carter Yagemann	Lok Yan	MTO
63	2022 - Director's Fellowship	University of Maryland, College Park	A Project to Catechize Dielectric Charging (ACDC)	Timothy Koeth	David Abe	MTO
64	2022 - Director's Fellowship	North Carolina State University	Electron Interactions with Microstructures and Defects During Additive Manufacturing	Tim Horn	David Abe	MTO
65	2023	University of Kansas	Enabling Spectrally Aware Cognitive RF Sensing (FP-005) Principal Investigator	Patrick McCormick	Frank Robey	STO
66	2023	Michigan Technological University	Shared Spectrum Target Detection and Track Estimation (STARDATE)	Adam Webb	Frank Robey	STO
67	2024	Rutgers University	Formable Ordered Microcomposite Energetics	Jonathan Singer	Hunter Martin	STO
68	2024	University of Michigan	View-Obstructed Delivery of Lunar Power by Optomechanically Guided Beams	Christopher Limbach	Michael Nayak	STO
69	2022 - Director's Fellowship	Portland State	Information-Driven Sensor Management via Nonparametric Divergence Estimation	John Lipor	Katherine Woolfe	STO
70	2022 - Director's Fellowship	Purdue University	FL-NTN: Fog Learning Orchestration of Heterogeneous Model Training across Hybrid Terrestrial and Non-Terrestrial Network Systems	Christopher Brinton	Nicholas Chang	STO
71	2024	University of Kentucky	Gas-surface scattering dynamics in very low Earth orbit	Savio Poovathingal	Sarah Popkin	TTO
72	2024	Rutgers University	Data Driven Engineering for VLEO Spacecraft Aerodynamic Performance Enhancement	Steven Berg	Sarah Popkin	TTO
73	2022 - Director's Fellowship	New York University	Integrated Visual Perception, Learning, and Control for Super Autonomous Robots	Giuseppe Loiano	Stuart Young	TTO



			
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