



Iowa State Research Day

March 27, 2018

Discover. Create. Together.

Posters, Exhibits and Creative Expressions Program

Great Hall, Memorial Union

Posters

1. Loreen Stromberg, Mechanical Engineering, CoE

Printed graphene interdigitated electrode aptasensor for in-field Salmonella biosensing

Top research interests: Biosensors, food-borne pathogens, nanomaterials, graphene.

Expertise to offer: Biosensor fabrication, surface functionalization, biorecognition agents, biochemistry.

Expertise sought: Business, marketing, startup forecasting, raising capital.

2. Maartje Schouten, Management, CoB

Social Hierarchy and Perspective Taking in Teams and Interpersonal Relations

Top research interests: Team dynamics, social hierarchy, perspective taking.

Expertise to offer: Experimental design; conceptual knowledge.

Expertise sought: Statistical; complementary perspectives.

3. Cindu Annand, Agricultural and Biosystems Engineering, CoE

Biobased Plastics with Natural Insecticide Functionality

Top research interests: Biopolymers and biocomposites.

Expertise to offer: Food engineering and processing.

Expertise sought: Chemistry-surface modification.

4. Lilong Chai, Agricultural and Biosystems Engineering, CALS

Mitigating particulate matter emissions from a commercial cage-free laying hen house in Iowa

Top research interests: Animal production, air quality, emissions mitigation, animal and worker health.

Expertise to offer: Sustainable animal production, air quality.

Expertise sought: Animal welfare, precision livestock farming.

5. Robin McNeely, Geographic Information Systems, DES

Update on the Iowa BMP (Best Management Practices) Inventory, Applications and Associated Datasets

Top research interests: GIS, environment, water quality, mapping, conservation, natural resources.

Expertise to offer: GIS analysis.

Expertise sought: Economics, statistics, human dimensions, forestry, biology.

6. Aliye Karabulut-Ilgü, Civil, Construction, and Environmental Engineering, CoE

Design and Development of an Augmented Reality Application to Teach Structural Analysis

Top research interests: Flipped learning, online education, technology in higher education.

Expertise to offer: Engineering education, flipped learning.

Expertise sought: Survey development, interest in scholarship of teaching.

7. Jennifer Newman, Mathematics, LAS

StegoDB: A Benchmark Database for Image Forensics

Top research interests: Digital image forensics, steganalysis, database development, image processing, machine learning.

Expertise to offer: Image processing, machine learning to signal and image processing, mathematical modeling.

Expertise sought: Field where applications of imaging forensics or image processing can be used.

8. Katarzyna Dembek, Veterinary Clinical Sciences, CVM

The role of adrenal steroids and neurosteroids in equine neonatal diseases

Top research interests: Endocrinology, neonatology, adrenal insufficiency, neurosteroids, sepsis, critical illness, equine medicine.

Expertise to offer: Advanced clinical/basic science training in clinical equine endocrinology, neonatology and equine medicine.

Expertise sought: Molecular biology, cell signaling and pathology, immunology, microbiome, molecular techniques.

9. Julie Bothell, Mechanical Engineering, CoE

X-ray Measurements for Spray Visualization

Top research interests: X-ray flow visualization, high-speed imaging, data science, multiphase flow, fluid mechanics.

10. Shaowei Ding, Mechanical Engineering, CoE

CIP2A Immunosensor Comprised of Vertically-aligned Carbon Nanotube Interdigitated Electrodes Towards Point-of-care Oral Cancer Screening

Top research interests: Biosensor, nano-materials, carbon nano tubes, graphene.

Expertise to offer: Surface chemistry, biosensing, electrochemistry, biofunctionalization.

Expertise sought: COMSOL simulation, biology, device fabrication.

11. Elizabeth L. Stegemoller, Kinesiology, CHS

Virtual Therapeutic Singing for Persons with Parkinson's Disease in Rural Iowa

Top research interests: Neuroscience, Parkinson's disease, music.

Expertise to offer: Human subjects.

Expertise sought: Signal processing.

12. Ulrike Passe, Center for Building Energy Research, DES

Human Behaviors Buildings, and Near Building Climates: Decision Support Tools to Increase Resilience of Urban Neighborhoods

Top research interests: Big data and sustainable cities decision making data driven science, human behavior and the built environment, architecture, climate change adaptation, natural ventilation in the built environment, design thinking, community engagement.

Expertise to offer: All of the above.

Expertise sought: Passe is leading a PIRI.

13. Anwasha Sarkar, Physics and Astronomy, LAS
Integrin molecular tensions in live cells are altered by substrate rigidity

Top research interests: Mapping and measuring integrin molecular tensions in live cells using integrin tension sensor on glass and elastic substrate. Atomic force microscopy to measure protein interactions.

Expertise to offer: Measuring very small forces in both live and immunostained cells using integrin molecular tension sensor with high resolution and sensitivity.

Expertise sought: Atomic force microscopy, lab with plasmid amplification facility.

14. Charles Kofi Adarkwa Nyamekye, Chemistry, LAS
Chemical Analysis of Nanodomains

Top research interests: Characterization of polymer thin films and self-assembled monolayers for applications in energy capture and storage devices, photovoltaic and biological sensors.

Expertise to offer: Spectroscopic techniques such as Raman and fluorescence spectroscopy to analyze unknown compounds and molecules, and analysis of thin films to obtain chemical and optical information.

Expertise sought: Thin film fabrication and analysis of polymers, self-assembled monolayers and surface chemistry reactions on metal and non-metal surfaces.

15. Curtis Covelli, Agricultural and Biosystems Engineering, CoE
Adhesive Free Bonding of Pine by Vibrational Welding

Top research interests: Welding, joining, biomaterials, ultrasonics, ionic liquids.

Expertise to offer: Ultrasonics.

Expertise sought: Chromatography, separations, material analysis, compositional analysis.

16. Brett Boote, Chemistry, CHS
Chemical Analysis of Nanodomains

Top research interests: Spectroscopy, raman, fluorescence, thin films.

Expertise to offer: Fluorescence microscopy, Raman spectroscopy.

Expertise sought: Nanocrystal synthesis, plant biology.

17. Michael Dorneich, Industrial and Manufacturing Systems Engineering, CoE

Methods for Engaging Underserved Populations

Top research interests: Human factors, human-computer interaction; adaptive systems; team-based learning.

Expertise to offer: Experimental design, human factors.

Expertise sought: Machine learning, qualitative data analysis.

18. Verena Paepcke-Hjeltness, Industrial Design, DES
Sketchnoting a Methodology, Fostering Team-Based Learning Conversations

Top research interests: Design thinking, creative confidence, sketchnoting, facilitation, design strategy, learning strategies.

Expertise to offer: Design thinking, sketchnoting, facilitation, design strategy, learning strategies.

Expertise sought: Any.

19. Helena Khazdozian, Ames Laboratory

The Potential of Exchange-Spring Magnets in Direct-drive Wind Turbines

Top research interests: Wind energy, renewable energy, magnetics, critical materials, rare earth elements.

Expertise to offer: Systems level analysis of end-use applications for materials in permanent magnet machines, wind energy technology.

Expertise sought: Mechanical and thermal performance of materials, industry knowledge and needs as they relate to magnetic materials and critical rare earth elements.

20. Dongsuk Kim, Veterinary Diagnostic and Production Animal Medicine, CVM

Transcriptomic profile analysis of brain inferior colliculus following acute hydrogen sulfide exposure

Top research interests: Hydrogen sulfide-induced neurotoxicity and unraveling the cascade of its neurodegeneration.

Expertise to offer: Mammalian toxicology, Has inhalation exposure set-up to study toxicity of inhaled chemicals.

Expertise sought: Molecular biology, genomics, neurology, imaging, neuroinflammation, oxidative stress and traumatic brain injury.

21. Michael Zeller, Veterinary Diagnostic Laboratory, CVM

Automating Genetic Classification for Hemagglutinin and Neuraminidase genes from Influenza A Viruses through Machine Learning Methods

Top research interests: Influenza A virus genetic and antigenic diversity, monitoring for emerging/unique strains.

Expertise to offer: Phylogenetics and computational biology.

Expertise sought: Computational techniques and programming.

22. Alex Wrede, Mechanical Engineering, CoE

Studying the Effects of Cavitation to Understand Traumatic-Brain Injuries

Top research interests: Traumatic-brain injuries.

Expertise to offer: Design considerations, process optimization practices, bio-engineering methodology, public speaking and microfluidics.

Expertise sought: Magnified high-speed imaging, cell-culturing and electronics.

23. Harmen Hendriksma, Ecology, Evolution and Organismal Biology, CALS

New neighbors for native bees: A little hive on the prairie

Top research interests: Honey bees, pollinators, pollination, bee health, insect nutrition, honey bee colony behavior, ecology, prairie.

Expertise to offer: Insect nutrition, health and behavior.

Expertise sought: Nutrition.

24. Laura R Jarboe, Chemical and Biological Engineering, CoE

Gleaning the Biotechnology Revolution: Decreasing the Knowledge Gap of the E. coli Genome

Top research interests: Metabolic engineering, biorenewables, microbial tolerance.

Expertise to offer: Microbial tolerance, microbial metabolism, biorenewables production.

Expertise sought: Enzyme characterization.

25. Mitchel Michel, Center for Bioplastics and Biocomposites, CALS

Functionalization of agave fibers for biocomposites

Top research interests: Biorenewable feedstocks.

Biocomposites, plastics.

Expertise to offer: Polymer compounding and molding, mechanical testing.

Expertise sought: Biomass processing, materials, polymers.

26. Elizabeth Sandquist, Genetics, Development and Cell Biology, LAS

Impact of introductory course-based research on gains in self-efficacy, science identity, and sense of community leading to persistence in STEM

Top research interests: Development of science self-efficacy, sense of community and scientific identity in freshmen participating in course-based research.

Expertise to offer: Science pedagogy relating course-based research and undergraduate persistence in science.

Expertise sought: Social and cognitive psychology relating to motivation and identity; social science; statistics.

27. Shan Jiang, Materials Science and Engineering, CoE

Synthesis and Application of Janus Particles

Top research interests: Polymers, colloids, emulsions and coatings.

Expertise to offer: Material synthesis and fabrication.

Expertise sought: Biology, medical device and diagnosis.

28. Samantha Tyner, Center for Statistics and Applications in

Forensic Evidence, VPR

Mock Jurors' Interpretation of Random Match Probabilities for Different Types of Forensic Evidence

Top research interests: Forensics, statistics, data visualization.

Expertise to offer: Computing skills, statistical background.

Expertise sought: Collaborator willing to share data.

29. Dushyanth Sirivolu, Mechanical Engineering, CoE

Top research interests: Traumatic brain injuries.

Expertise to offer: Insights into the mechanical properties of the brain.

Expertise sought: Expertise in analyzing deformation in the brain.

30. Sandeep Dave, Genetics, Development and Cell Biology, LAS

Distinct regions of the yeast kinesin-8, Kip3, tail regulate the stability of astral microtubules spatially and the spindle midzone temporally

Top research interests: Microtubule cytoskeleton dynamics.

Expertise to offer: Microtubule dynamics, yeast genetics, cytoskeleton imaging.

Expertise sought: Tissue cell culture, bioinformatics.

31. Martin Silerio-Vazquez, Statistics, LAS

Automatic Shoeprints Matching

Top research interests: Statistical computing, statistical learning.

Expertise to offer: Statistic modeling.

Expertise sought: Forensics.

32. Balaji Narasimhan, Nanovaccine Institute, VPR

Nanovaccine Institute Research Overview

Top research interests: Biomaterials, vaccine and drug delivery, nanotechnology, aging, healthcare policy.

Expertise to offer: New technologies for drug and vaccine delivery.

Expertise sought: Healthcare policy.

33. Sojung Lee and Eunha Jeong, Apparel, Events and

Hospitality Management, CHS

Local Food Promotion - Can Rural Bed and Breakfast Operations be a New Market?

Top research interests: Tourism, food science, consumer behaviors.

Expertise to offer: Consumer behaviors.

Expertise sought: Technology, computer science.

34. Elisa Guadalupe Rizo, World Languages and Cultures, LAS

Popular Theater in Equatorial Guinea: Between the Slums and New

Urban Developments

Top research interests: Globalization, civic participation, development, Africa, Latin America, theater.

Expertise to offer: Analyze perspectives from the Global South (i.e. developing countries) about globalization; theater, performance and literature of the African Diaspora in the Spanish speaking world (Sub-Saharan Africa and Latin America); theories: citizenship, borders, migration, human rights, ethnicity and race studies.

Expertise sought: Critical theories of development, urban design; knowledge of environmental studies, sustainability, theories of democracy.

35. Soyoung Park, Center for Statistics and Applications in

Forensic Evidence, LAS

A semi-automated algorithm to compare shoe out-sole impressions

Top research interests: Statistics, data science, machine learning, forensic evidence.

Expertise to offer: The forensic pattern evidence data that CSAFE collected.

Expertise sought: Computer vision, image analysis.

36. James Kruse, Center for Statistics and Applications in Forensic Evidence, LAS

Incorporating a statistical model into forensic shoe print analysis

Top research interests: Statistics incorporated into forensic pattern evidence.

Expertise to offer: Pattern evidence data collection and general biology.

Expertise sought: Experts in data collection and pattern evidence.

37. Lotfi ben Othmane, Electrical & Computer Engineering, CoE

Towards Cyber Resilience for Connected Vehicles

Top research interests: Cyber security, software security, cyber resilience.

Expertise to offer: Cyber resilience.

Expertise sought: Connected vehicle and intelligent transportation systems.

38. Denis Prodius, Ames Laboratory

Butterflies, melted chocolates and Poseidon: disentangling art puzzles of new high-tech materials

Top research interests: Rare earth metals recycling, ionic liquids, single-molecule magnets, anticancer drugs.

Expertise to offer: Design, synthesis and characterization of task-specific materials.

Expertise sought: Any.

39. Linda Shenk, English, LAS

Development of a Hybrid Model for Weatherization Adoption in a Multilayer Social Network

Top research interests: Storytelling, cognitive narratology, social capital building, community resilience, equity, agent-based modeling.

Expertise to offer: Use of models for storytelling and community engagement.

Expertise sought: Agent-based modeling.

40. Shaunik Sharma, Biomedical Sciences, CVM
The neuroinflammatory role of Fyn-PKC- δ signaling pathway in the mouse kainate model of epileptogenesis

Top research interests: Neuroscience, neurodegeneration and inflammation; epilepsy research.

Expertise to offer: Excellent science communication skills, interpersonal and transferrable skills.

Expertise sought: Grant writing and good scientific skills.

41. Bambi Yost, Landscape Architecture, DES
14 Community-based educational, green playcapes and schoolyards; Challenging perceptions of risk in public schoolyards and playground standards; Earlham (k-12) Schoolyard Master Plan; Mitchell (k-8) Schoolyard Master Plan; Nebinger (k-8) EPA Stormwater Natural Outdoor Classroom; Church of the Epiphany Master Plan

Top research interests: Community-based green schoolyard design and designing for health; large-scale, innovative, city-wide design initiatives focused on education, health and environmental justice.

Expertise to offer: Community-based research and participatory-based design research; physical design and construction of educational, green schoolyards and playscapes; years of research on perception of risk and play and schoolyard design, implementation and evaluation.

Expertise sought: Environmental education and program evaluation; mixed-methods, meta-data analysis.

42. Ameerah Muhsinah Jamil, Computer Science, LAS
Code Transformation to Mitigate Dependency Vulnerabilities

Top research interests: Software security.

Expertise to offer: Security-related information.

Expertise sought: Machine learning, qualitative data analysis.

43. Chen Shi, Electrical and Computer Engineering, CoE
A Dynamic Taint Analysis Tool for Android App Forensics

Top research interests: Digital forensics.

Expertise to offer: Java programming, Android OS, taint analysis.

Expertise sought: Java programming, Android OS, taint analysis.

44. Bharathi Niveditha Palanisamy, Biomedical Sciences, CVM
Pesticide Exposure Leads to Mitochondrial Dysfunction and Inflammation in Enteric Glial Cells

Top research interests: Neuroscience, stem cells, toxicology.

Expertise to offer: Animal study, gastrointestinal study, histology.

Expertise sought: Primary culture, development of cell line.

Exhibits

David Grewell, Center for Bioplastics and Biocomposites, CALS
Center For Bioplastics and Biocomposites

Top research interests: Bioplastics, biocomposites, sustainable materials.

Expertise to offer: Engineering, chemistry, LCA, material science.

Expertise sought: Industry partners.

Robert C. Brown, Bioeconomy Institute (BEI), VPR
Bioeconomy Institute

Top research interests: Biorefining technologies at farm, regional, national levels that emphasize low cost modular manufacturing and process intensification, environmental benefits and cost-advantaged bioproducts.

Expertise to offer: BEI helps faculty teams develop new research programs and respond to solicitations that require interdisciplinary research and outreach. BEI's support staff helps develop proposals and

budgets and manages research programs post-award.

Expertise sought: Advanced manufacturing, sustainable and renewable energy, and bioproducts. We emphasize interdisciplinary teams to explore grand challenges such as water quality and energy security.

Stuart Barkley, Mechanical Engineering, CoE
Research Art

Top research interests: Combustion, rocket propulsion, plasma, energetic, laser diagnostics.

Andrew Bodling, Aerospace Engineering, CoE
Research Art

Top research interests: Aeroacoustics, computational fluid dynamics, large eddy simulations, trailing edge noise.

Trevor Riedemann, Ames Laboratory, VPR
Research Art

Top research interests: Rare earth metals, powder metallurgy, gas atomization, rotating disk atomization.

Expertise to offer: Rare earth metal and alloy preparation, single crystal growth, metal powder preparation. Hot and cold fabrication of metals and alloys.

Expertise sought: Researchers who are using or in need of REM, powder metal inputs or crystals for study.

Linyue Gao, Aerospace Engineering, CoE
Research Art

Top research interests: Wind turbine icing.

Expertise to offer: Wind turbine icing and anti-/de-icing solutions.

Expertise sought: Field measurements using lidar, radar, etc.

Allison Birnbaum, Genetics, Development & Cell Biology, CALS
Research Art

Top research interests: Genetics, aging, tissue homeostasis, proteomics.

Expertise to offer: Molecular biology.

Expertise sought: Genomics, bioinformatics.

Vignesh Suresh, Mechanical Engineering, CoE
Structured Light System (SLS) technique for microscopic systems

Top research interests: Optics, virtual reality.

Expertise to offer: Image processing.

Expertise sought: Machine learning.

Kejue Jia, Biochemistry, Biophysics and Molecular Biology, LAS
Research Art-Meghana

Top research interests: Structural biology.

Expertise to offer: Computational methods.

Expertise sought: Proteins.

Eric Jones, Agronomy, CALS
Research Art

Top research interests: Biology and ecology of herbicide-resistant weeds.

Expertise to offer: Herbicide physiology.

Expertise sought: Plant physiology.

Christopher Hopkins, Music, LAS
Musically Artistic Computation: Analysis, Creative Expression, Visualization

Top research interests: Algorithmic-computational approaches to analysis and creativity in the fine arts (especially intersections of visual arts and music), electroacoustic musical composition, dialectics between historical and experimental-contemporary models in artistically creative processes.

Expertise to offer: Sound and music computing including analytics, creativity and interactivity; visual representations of deep structure in artistic forms (especially musical).

Expertise sought: Visual analytics in biological or physical sciences (basic research); symbolic logic, model theory, or graph theory applied to analysis and visualization, especially in cross-disciplinary contexts.

Anthony LoCurto, Mechanical Engineering, CoE
Research Art

Top research interests: Combustion and laser diagnostics.

Expertise to offer: Experimental design of combustion environments and optical setups.

Expertise sought: Machine learning applications to combustion and complex modeling of combustion phenomena.

Bhavika Patel, Genetics, Development and Cell Biology, LAS
Research Art

Top research interests: Neuroscience, stem cell biology, cell differentiation, cell biology, therapeutic strategies, regenerative medicine.

Expertise to offer: Cell biology.

Expertise sought: Polymer science.

Rajiv Kaudal, Physics and Astronomy, LAS
Atomic Force Microscopy of Cu Mesh on PET Substrate

Top research interests: Fabricating white organic light emitting diode, studying its opto-electronic characteristics; design and study of patterns on OLED substrates using various probing techniques like AFM, SEM, etc. making sensing applications devices.

Expertise to offer: Fabricate devices and characterize them.

Expertise sought: Simulation of the data and theoretical modeling.

Khusboo Rana, Physics and Astronomy, LAS
Research Art

Top research interests: Superconductivity.

Expertise to offer: Interesting perceptions of the universe, time, space, magnetism, etc.

Expertise sought: Art, computer-aided art.

Kimberly Moss, Art and Visual Culture, DES
Illuminating Science

Top research interests: Scientific visualization, medical illustration, visual communication, visual arts, instructional design, creative technologies.

Expertise to offer: scientific visualization, medical illustration, visual communication, visual arts, instructional design.

Expertise sought: Computer science, programming, biomedical education, informal science education for non-specialists, interactive technologies.

Tim Cullinan, Materials Science and Engineering, CoE
Research Art

Meghana Akella, Mechanical Engineering, CoE
Research Art

Top research interests: Acoustic self-assembly, microfluidics.

Expertise to offer: Material synthesis using self-assembly, 3D printing, science communication and outreach.

Expertise sought: Self-assembly of materials, micromaterials, microfluidics, science communication.

Amanda Petefish-Schrag, Music, LAS
Research Art

Top research interests: Re-contextualizing ritual performance, material relationship to story and narrative.

Expertise to offer: Puppetry – design, construction and performance; playwriting; acting/directing; ritual theatre, feminist theatre and eco-theatre practice.

Expertise sought: Dramaturgy (various disciplines), ecology/environment, gender/women's studies, materials development.

Kenneth R. Jolls, Chemical and Biological Engineering, CoE
Research Art

Top research interests: Chemical Thermodynamics (visualized); Visual thinking as a pedagogical tool.

Pranjali Naik, Chemistry, LAS

Electron microscopy image of a catalytic cerium oxide nanocube

Top research interests: Catalyst development for efficient conversion of biorenewable materials into fine chemicals.

Expertise to offer: Characterization of properties in materials like surface area, porosity, ordered structure, dispersion of metals on support, acidic and basic property of material.

Expertise sought: Instrument expertise for the characterization and analysis. Eg. Raman, XPS, MS.

Maria Emilia Dueñas, Chemistry, LAS
Research Art

Top research interests: Advance and apply high-spatial resolution (HSR) matrix-assisted laser desorption ionization-mass spectrometry imaging (MALDI-MSI) for the mapping of small metabolites and lipids at the cellular and sub-cellular level.

Expertise to offer: Ability to simultaneously acquire spatial and chemical information (mainly lipids and other small molecules) on a flat surface (down to 5 um spatial resolution).

Expertise sought: Biology knowledge on plant or animal systems, understanding at the metabolite level.

Creative Expressions

Wesley Wierson, Genetics, Development and Cell Biology, LAS
Floating head in Z-major

Top research interests: Genome engineering, functional genomics, regulatory, genetic engineering of consumer products, science outreach and communication.

Expertise to offer: Molecular genetics, genetic engineering.

Expertise sought: Science outreach networks, ideas for natural genetic variant introgression into organisms.

Debra Marquart, English, LAS

Small Buried Things: A Poet's Response to Extraction

Top research interests: Creative writing and environment; research-based non-fiction and poetry about place, landscape and environment, including natural and built-environments.

Expertise to offer: Creative arts – music, language arts, performance.

Expertise sought: Scientists who wish to incorporate elements of language arts and music in their research.

Eric Mach, Mechanical Engineering, CoE
Surface Plot Sampled by Picasso

Top research interests: Biosensing.

Expertise to offer: Adobe Illustrator.

Expertise sought: UHF RFID Antenna Design.

Sebastian Manzano, Chemistry, CALS

Drug release from modified mesoporous materials

Top research interests: Chemistry.

Expertise to offer: Nanomaterials.

Expertise sought: Nanomaterials.

