



DRIVING TOMORROW

Our ten-year plan to lead and innovate

Driving Tomorrow Research Initiatives—Grand Challenges Research Grants *Fall 2016*

Provost Karen Hanson has announced 29 Grand Challenges Research grants to advance the research goals of Driving Tomorrow, the TC Campus Strategic Plan. The Driving Tomorrow research investment totals \$3.6 million, including \$1.48 million for 21 exploratory research grants and \$2.15 million for 8 collaborations shaped by interdisciplinary work groups that were built on an earlier [Call for Ideas process](#). The funds were reallocations earmarked for strategic plan investments during annual compact planning with college deans, augmented by funds from the Global Programs and Strategy Alliance for projects supporting the U's internationalization goals. [More on the Driving Tomorrow Research Initiatives >](#)

The 29 funded collaborations, listed below, address the University's [five interrelated Grand Challenges areas of special focus](#), with one integrative initiative spanning multiple areas.

[Project summaries are posted on the Driving Tomorrow website](#) (strategic-planning.umn.edu).

Advancing Health through Tailored Solutions

A community-based approach toward advancing personalized medicine in underserved populations

\$49K GC Exploratory Research Grant

Co-PIs: Kathleen A. Culhane-Pera, Family Medicine; Robert J. Straka, Experimental & Clinical Pharmacology; Bharat Thyagarajan, Laboratory Medicine & Pathology

Team Members: Jeffrey Bishop, Experimental & Clinical Pharmacology; Muaj Lo, West Side Community Health Services; Heather Zierhut, Genetics, Cell Biology, & Development

Development of a clinical precision medicine program in ovarian cancer as a paradigm for 21st-century tailored health care solution

\$60K GC Exploratory Research Grant

Co-PIs: Constantin Aliferis, Medicine; Joshua Baller, Supercomputing Institute; Pamala Jacobson, Experimental & Clinical Pharmacology; Andrew Nelson, Laboratory Medicine & Pathology; Boris Winterhoff, Obstetrics, Gynecology & Women's Health

Team Members: Ahmad Abusalah, Institute for Health Informatics; Peter Argenta, Obstetrics, Gynecology & Women's Health; Subbaya Subramanian, Surgery; Martina Bazzaro, Obstetrics, Gynecology & Women's Health; Linda Carson, Obstetrics, Gynecology & Women's Health; Melissa Geller, Obstetrics, Gynecology & Women's Health; Mahmoud Khalifa, Laboratory Medicine & Pathology; Sally Mullany, Obstetrics, Gynecology & Women's Health; Steve Shen, Institute for Health Informatics; Tim Starr, Obstetrics, Gynecology & Women's Health; Gyorgy Simon, Institute for Health Informatics

Keys to preventing cancer: Unlocking barriers to HPV vaccinations in low-income countries

\$50 GC Exploratory Research Grant; includes \$30k international enhancement award/Global Programs & Strategy Alliance

Co-PIs: Nicole E. Basta, Epidemiology & Community Health; Hee Yun Lee, Social Work

Team Members: Fareed A. Awan, Philosophy; Cecily Banura, Child Health & Development Center, Makerere University; Shalini L. Kulasingam, Epidemiology & Community Health; Ruby H. Nguyen, Epidemiology & Community Health

Are networks key to solving America's healthcare crisis?

\$50k GC Exploratory Research Grant

Co-PIs: Barbara Daniels, Medicine; Russell Funk, Strategic Management & Entrepreneurship; Aks Zaheer, Strategic Management & Entrepreneurship

Toward a Minnesota model for brain health in youth sports

\$48k GC Exploratory Research Grant

Co-PIs: Jessica Brown, Speech-Language-Hearing Sciences; Bharathi Jagadeesan, Radiology; Christophe Lenglet, Radiology; Toben F. Nelson, Epidemiology & Community Health; Moira Novak, Athletics; Francis Shen, Law

Minnesota Precision Medicine Collaborative:

Transforming health and advancing equity

\$500k GC Interdisciplinary Work Group Collaboration

Co-PIs: Ellen Demerath, Epidemiology & Community Health; Pamala Jacobson, Experimental & Clinical Pharmacology; Kingshuk Sinha, Supply Chain & Operations; Susan M. Wolf, Law, Medicine & Public Policy

Team Members: Gerald August, Family Social Science; Marilyn Bruin, Design, Housing, & Apparel; Michael Conzemius, Veterinary Clinical Sciences; Jigna Desai, Gender, Women, & Sexuality Studies;

Joseph Gaugler, Nursing; Christy Haynes, Chemistry; Bin He, Biomedical Engineering; Dan Knights, Computer Science & Engineering; Alex Rothman, Psychology; Paula Termuhlen, Surgery; Jakub Tolar, Pediatrics, Stem Cell Biology, Genetics & Genomics

Fostering Just and Equitable Communities

Human rights collaborative and faculty-student human rights laboratory to promote equitable civil society

\$110k GC Exploratory Research Grant; includes \$50k international enhancement award

Co-PIs: Barbara Frey, Global Studies; Fionnuala Ni Aolain, Law; James Ron, Global Policy; Joachim Savelsberg, Sociology

Team Members: Alejandro Baer, Sociology; Elizabeth Heger Boyle, Sociology; Greta Friedemann-Sánchez, Global Policy; Jennifer Green, Law; Lisa Hilbink, Political Science; Harry Lando, Public Health; Steven Miles, Medicine; Stephen Meili, Law; Leigh Payne, Human Rights Program; Christopher Roberts, Law

Social justice through collaborative artistic expression: The state of Iberoamerican Studies Series: Human rights across the disciplines and Voice to Vision project

\$55k GC Exploratory Research Grant; includes \$15k international enhancement award

Co-PIs: Luis A. Ramos-Garcia, Spanish & Portuguese Studies; David Feinberg, Art

Team Members: Beth Andrews, Art; Patricia Ariza, Artistic Director La Candelaria Theater; Nelsy Echávez-Solano, Spanish Portuguese Studies; Carlos E. Satizábal, Theater Director, Universidad Nacional da Colombia

Understanding barriers to health equity

\$56k GC Exploratory Research Grant

Co-PIs: Sarah Gollust, Health Policy & Management; Joanne Miller, Political Science

Voicing the global immigration crisis: Documentation and analysis of immigrant stories for social change

\$80k; includes \$20k international enhancement award

Co-PIs: Erika Lee, Immigration Research; Moin Syed, Psychology

Assessing interventions for justice and equity

\$249k GC Interdisciplinary Work Group Collaboration

Co-PIs: Myron Orfield, Civil Rights & Civil Liberties Law; Christopher Uggen, Sociology

Team Members: Ragui Assaad, Global policy; Yingling Fan, Urban & Regional Planning; Paul Glewwe, Applied Economics; Rhonda Jones-Webb, Epidemiology & Community Health; Kola Okuyemi, Family Medicine & Community Health

Enhancing Individual and Community Capacity for a Changing World

Art of healing: Embodied storytelling as resistance and practice

\$110k GC Exploratory Research Grant; includes \$50k international enhancement award

Co-PIs: Abimbola Asojo, Housing & Apparel Design; Ananya Chatterjea, Theater Arts & Dance; Jigna Desai, Gender, Women, & Sexuality Studies; Roli Dwivedi, Community-University Health Care Center; Priscilla Gibson, Social Work; Lena Palacios, Gender, Women, & Sexuality Studies; Madhuri Shors, Community-University Health Care Center; Catherine Squires, Communication Studies

Climate, conflict, and displacement: Shifting patterns in the Horn of Africa arid lands

\$96k GC Exploratory Research Grant; includes \$46k international enhancement award

Co-PIs: Cheryl Robertson, Population Health & Systems, School of Nursing; Dominic Travis, Ecosystem Health Initiative

Team Members: Eunice Areba, Nursing; Joel Hartter, Environmental Studies Program, University of Colorado-Boulder; Sarah Hoffman, Nursing; Katey Pelican, Veterinary Population Medicine; Michael Mahero, Veterinary Population Medicine; Shamilah Namusisi, One Health Resident, Makerere University; Carolyn Porta, Nursing, Epidemiology; Paul M. Porter, Agronomy & Plant Genetics; Innocent B. Rwego, Veterinary Population Medicine; Jacinta Mukulu Waila, One Health Resident, Makerere University

Cracking the speech code: A cross-linguistic neurobehavioral approach to language learning in typical and atypical populations

\$51k GC Exploratory Research Grant; includes \$4k international enhancement award

Co-PIs: Yang Zhang, Speech-Language-Hearing Sciences; Jed T. Elison, Child Development; Hui Zou, Statistics; Xiaohu Yang, Laboratory for Language & Cognition; Iku Nemoto, Biomedical Engineering; Hua Shu, National Key Laboratory of Cognitive Neuroscience & Learning; Suiping Wang, Psychology

Team Members: Jean Decety, Child NeuroSuite and the Social Cognitive Neuroscience Laboratory, University of Chicago; Mark DeRuiter, Speech-Language-Hearing Sciences; Kaibao Hu, Foreign Languages, Shanghai Jiao tong Univeristy; Patricia Kuhl, Speech & Hearing Sciences, University of Washington; Michael Reiff, Pediatrics; Robert S. Schlauch, Speech-Language-Hearing Sciences

Reducing early language disparities: A key to lifelong academic, socioeconomic, and health success

\$60k GC Exploratory Research Grant

Co-PIs: Lizbeth H. Finestack, Speech-Language-Hearing Sciences; Scott McConnell, Educational Psychology & Child Psychology

Reminders for readiness: E-communication to support parents in promoting early childhood development

\$250k GC Interdisciplinary Work Group Collaboration

Co-PIs: Akosua O. Addo, Music; Megan Gunnar, Institute of Child Development; Richard Lee, Psychology; Sheila Riggs, Primary Dental Care; Olihe Okoro, Pharmacy Practice & Pharmaceutical Sciences; Aaron Sojourner, Work & Organizations

Team Members: Amy Gross, Pediatrics; Katy Kozhimannil, Health Policy & Management; Amy Susman-Stillman, Center for Early Education & Child Development; Susan Walker, Family Social Science

Shared leadership lab: Analyzing success factors to address complex societal challenges

\$300k GC Interdisciplinary Work Group Collaboration; includes \$50k international enhancement award

Co-PIs: Akosua O. Addo, Music; Vanessa Laird, Leadership & Management; Hari Osofsky, Joint Degree Program in Law, Science, & Technology; Kathy Quick, Leadership & Management; Myles Shaver, Strategic Management & Entrepreneurship

Team Members: John Finnegan, Epidemiology & Community Health; David MacCallum, Civic Consulting Minnesota; Guillermo Narváez, Leadership & Management; Jennifer Pelletier, Minnesota Department of Health; Sheila Riggs, Primary Dental Care; Art Rolnick, Social Problems & Policy Analysis

Assuring Clean Water and Sustainable Ecosystems

21st-century technologies for advancing bio-manufacturing

\$85k GC Exploratory Research Grant; includes \$25k international enhancement award

Co-PIs: Claudia Schmidt-Dannert, Biochemistry, Molecular Biology, & Biophysics; Vincent Noireaux, Physics

Team Members: Mikael Elias, BioTechnology Institute; Fernando Lopez-Gallego, Biofunctional Nanomaterials Laboratory, Spain; Bernd Nidetzky, Biotechnology, Biochemistry, & Engineering, University of Graz; Sven Panke, Biosystems, Science, & Engineering, ETH Zürich; Maureen Quin, BioTechnology Institute; Jon Marles Wright, Structural & Synthetic Biology Laboratory, University of Edinburgh

Innovations at the nexus of food, energy, and water: Reclaiming wastewater from local food industries to produce energy and high-value urban crops

\$60k GC Exploratory Research Grant

Co-PIs: Alptekin Aksan, Mechanical Engineering; Neil Anderson, Horticultural Science; Bill Arnold, Environmental, & Geo-Engineering; Julie Grossman, Horticultural Science; William Northrop, Mechanical Engineering; Paige Novak, Civil, Environmental, & Geo-Engineering; Mary Rogers, Horticulture Science; Chengyan Yue, Horticultural Science

Protection of biodiversity and ecosystems services through early detection of tree disease using hyperspectral remote sensing

\$60k GC Exploratory Research Grant

Co-PIs: Jeannine Cavender-Bares, Ecology, Evolution & Behavior; Rebecca Montgomery, Forest Resources; Jennifer Juzwik, Plant Pathology

Team Members: ; John Gamon, University of Nebraska- Lincoln; Sarah Hobbie, Ecology, Evolution, & Behavior; Forest Isbell, Cedar Creek Ecosystem Science Reserve; Phil Townsend, University of Wisconsin-Madison; Art Zyguelbaum, University of Nebraska-Lincoln

Sustainable development: Architecture and planning within the ecological footprint of one planet

\$110k GC Exploratory Research Grant; includes \$50k international enhancement award

Co-PIs: Richard Graves, Center for Sustainable Building Research; Bonnie Keeler, Institute on the Environment

Team Members: Mary Guzowski, Architecture; Jessica Hellman, Institute on the Environment; Sarah Hobbie, Ecology, Evolution, & Behavior; Stephen Polasky, Applied Economics; Richard Strong, Center for Sustainable Building Research

Developing a simple, inexpensive smart chip to detect water pollutants

\$315k GC Interdisciplinary Work Group Collaboration; includes \$50k international enhancement award

Co-PIs: Daniel R. Bond, Microbiology & Immunology BioTechnology Institute; Mikael Elias, Biochemistry; Jeffrey A. Gralnick, Microbiology & Immunology BioTechnology Institute; Mark Herzberg, Diagnostic & Biological Science; Lawrence P. Wackett, Biochemistry

Team Members: William Arnold, Civil, Environmental & Geo-Engineering; Paige J. Novak, Civil, Environmental & Geo-Engineering; Casim A. Sarkar, Biomedical Engineering; Michael Smanski, Biochemistry, Molecular Biology, & Biophysics; Joseph Talghader, Electrical & Computer Engineering

Feeding the World Sustainably

Addressing the challenge of tuberculosis in the animal-human interface

\$85k GC Exploratory Research Grant; includes \$25k international enhancement award

Co-PIs: Srinand Sreevatsan, Veterinary Population Medicine; David Boulware, Infectious Diseases & International Medicine

Team Members: Joel Bazira, Mbarara University; Dominic Travis, Veterinary Population Medicine

Big-data transparency in global food supply

\$96k GC Exploratory Research Grant; includes \$46k international enhancement award

Co-PIs: Derric Pennington, Institute on the Environment; Anu Ramaswami, Technology & Environmental Policy; Shashki Shekhar, Computer Science; Timothy M. Smith, Bioproducts & Biosystems Engineering

Microbiomes in engineered ecosystems: Integrative science to elucidate microbiome roles in mediating plant, soil, ecosystem, and human health

\$60k GC Exploratory Research Grant

Co-PIs: David Baumler, Food Science & Nutrition; Jessica Gutknecht, Soil, Water Climate; Corey Hirsch, Soil, Water, & Climate; Linda Kinkel, Plant Pathology; Jonathan Schilling, Bioproducts & Biosystems Engineering

Team Members: Elizabeth Borer, Ecology, Evolution, & Behavior; Daryl Gohl, Genomics Center; Julie Grossman, Horticulture; Satoshi Ishii, BioTechnology Institute; Peter Kennedy, Plant Biology; H. Corby Kistler, Plant Pathology; Georgiana May, Ecology, Evolution, & Behavior; Paige Novak, Civil, Environmental, & Geo-Engineering; Eric Seabloom, Ecology, Evolution, & Behavior

Reinventing year-round food production in Minnesota

\$45k GC Exploratory Research Grant

Co-PIs: John Erwin, Horticultural Science; Ned Mohan, Electrical & Computer Engineering

Team Members: Kathy Draeger, Minnesota Extension Service; Greg Schweser, Minnesota Extension Service

Charting a path for Midwest agriculture through scenario-based foresight

\$150k GC Interdisciplinary Work Group Collaboration

Co-PIs: Mae Davenport, Forest Resources; Nicholas Jordan, Agronomy & Plant Genetics; David Mulla, Soil, Water, & Climate; David Rand, Psychology, Economics; Tonya Schoenfuss, Food Science & Nutrition Technology; Nathan Springer, Plant Biology; Montserrat Torremorrell, Veterinary Medicine

Team Members: David Beurle, Future IQ Partners; Heather Branigan, Future IQ Partners; Kris Johnson, The Nature Conservancy; Charlotte Melin, German, Scandinavian, & Dutch; Nathan Meyer, Center for Agriculture, Food & Natural Resources; Mark Pedelty, Communication Studies & Anthropology; Bryan Runck, Geography, Environment, & Society

Sustaining food production, health, and the environment

\$147k GC Interdisciplinary Work Group Collaboration

Co-PIs: Allen Levine, Food Science & Nutrition; David Tilman, Ecology, Evolution & Behavior

Team Members: Jason Hill, Bioproducts & Biosystems Engineering; Alexandra Klass, Law; Stephen Polasky, Ecological & Environmental Economics; Anu Ramaswami, Science Technology & Public Policy; Brian Steffenson, Plant Pathology

**Integrative GC Research Initiative:
Assuring Clean Water and Feeding the World**

Also addresses the Enhancing Community Capacity theme

\$250k GC Interdisciplinary Work Group Collaboration

Backyard phenology: Integrating citizen science and public art to build collective agency on climate change

Co-PIs: Christine Baeumler, Art; Mae Davenport, Forest Resources; Nicholas Jordan, Agronomy & Plant Genetics; Rebecca Montgomery, Forest Resources

Team Members: Chris Buyarski, Forest Resources; Francis Bettelyoun, Native Medicine Garden; Kate Flick, Forest Resources; Beth Mercer-Taylor, Institute on the Environment