UNIVERSITY of NEBRASKA
LINCOLN

Nirupam Aich

https://engineering.unl.edu/cee/faculty/nirupam-aich/

Research category: Water pollution; water/wastewater quality, management, and reuse; chemical and microbial risk research including water remediation; health and water research including climate impacts

The overarching goal of my research is to protect public health through water quality engineering and physical-chemical treatment of drinking water and wastewater. Especially, my research focuses on the mitigation of emerging water pollution (e.g., per- and polyfluoroalkyl substances or PFASs) and resource recovery through the safer and intelligent design and development of advanced materials, membranes, and manufacturing. In pursuing this, I leverage my expertise in environmental engineering, chemical engineering, and materials sciences and develop in-department and interdisciplinary collaborations with other engineering disciplines, chemistry, data science, and environmental health sciences. Topics of interest include:

(i) Advanced (nano)materials and processes for PFAS remediation and water treatment/reuse,

(ii) Additive manufacturing or 3D printing for water treatment,

(iii) Sustainable design of nanocomposite membranes for water treatment and resource recovery,

(iv) Data driven (nano)material discovery for environmental remediation and separations,

(v) Global health inequity due to air, soil, and water pollution from electronic and plastic waste recycling (micro/nanoplastic pollution).

Sasitharan Balasubramaniam

https://cse-apps.unl.edu/facdb/users/96/details

Researh category: Applications of data sciences, AI, and machine learning to water research

Areas of research and professional interest: Molecular and Nano Communications, Terahertz Communications, Internet of Bio-Nano Things, Bio-inspired Computing and Communications

Shannon Bartelt-Hunt

https://engineering.unl.edu/civil/shannon-bartelt-hunt/

Research categories: Chemical and microbial risk research including water remediation; health and water research including climate impacts

Areas of research and professional interest: Physicochemical fate of contaminants in agroecosystems, contaminant fate and transport in landfills, water reuse in agricultural systems

Andrea Basche

https://agronomy.unl.edu/basche

Research category: water resource management including ecological water management

Areas of research and professional interest: Resource use efficiency in cropping systems, Soil health, Agricultural systems modeling, Agroecology, Water resources, Human and policy dimensions of agricultural decision-making

Mona Bavarian

https://engineering.unl.edu/chme/faculty/mona-bavarian/

Research categories: Environmental and chemical sciences; water and energy nexus

Areas of research and professional interest: Polymerization Reaction Engineering; Process Modeling, Simulation, Optimization, and Control of Chemical Processes and Electrochemical Systems; Separation and Purification Processes; Advanced Manufacturing; Process Intensification; Continuous Flow Chemistry

Jesse Bell

https://www.unmc.edu/publichealth/departments/environmental/facultyandstaff/jesse-bell.html

Research category: Health and water research including climate impacts

My research explores the relationships of extreme weather, climate variability, and climate change on natural and human processes. The climate that we experience controls much of the world around us. When our climate abruptly changes or gradually shifts, there can be related consequences to both our communities and our health. The goal of my work is to understand these linkages between climate and

health, so that we can help prepare our populations for climate- and weather-related disasters. To determine these relationships, I use a variety of climate and environmental data sources to explore associations with human health outcomes. Much of my experience in this field comes from my previous position, where I created the first joint research position between the National Oceanic and Atmospheric Administration and the Centers for Disease Control and Prevention. The role of this dual appointment was to provide a mechanism to integrate NOAA climate and environmental data into CDC health projects. This work provided me firsthand experience that is now the foundation for my current research. In addition to this, my participation as a lead author for the U.S. Global Change Research Program report "The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment" that was released by the White House in 2016 has also shaped my professional interests. A key finding of this report is that climate change is a significant threat to the health of the American people and that every American is vulnerable to the health impacts of climate change. As this finding suggests, there are many research opportunities to evaluate and understand the role of climate on human health. By accomplishing this work, we have the potential to save lives and create more climate resilient communities.

Andrew Benson

https://foodscience.unl.edu/faculty/dr-andrew-benson

Research category: Health and water research including climate impacts

Areas of research and professional interest:

1. Genome evolution in pathogenic bacteria. Comparative genomics, phylogenetics, and molecular biology are used to identify important events in the genome of pathogenic bacteria and understand the effects of genes and pathways marked by these events.

2. Evolution and development of gut microflora. 16S rRNA fingerprinting and sequencing is being used to examine development of the highly complex gut microflora in mammalian model systems, with the ultimate goal of identifying host genes that affect gut flora development.

Jessica Corman

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=2440

Research categories: Water pollution; water resource management including ecological water management

I study nature through the lens of chemistry. Elements make up all living and non-living material and how elements move through ecosystems can have profound implications for ecosystem structure and

function. In my research, I combine techniques from biogeochemistry and ecosystem ecology to understand processes that influence elemental flows into and through ecosystems particularly vulnerable to nutrient pollution: lakes and streams.

Barry Cheung

https://chem.unl.edu/barry-cheung

Research category: Environmental and chemical sciences

Research interests: Design and synthesis of nanomaterials by abstracting efficient designs from nature; self-assembly of biomimic nanomaterials

Aaron Daigh

https://agronomy.unl.edu/daigh

Research category: Water pollution

Research interests: Vadose Zone Hydrology, Chemical Fate and Transport, Soil Physics, Water Quality, Contamination, Remediation, Reclamation, Agricultural Water Management, Ecohydrology, Agronomy

Shudipto Dishari

https://engineering.unl.edu/chme/faculty/shudipto-dishari/

Research category: Water and energy nexus

Areas of research and professional interest: polymers and nanomaterials, thin films and membranes, energy, antimicrobial materials, chemobiorecognition, bioseparation

David Dunigan

https://plantpathology.unl.edu/david-dunigan

Research category: Water/wastewater quality, management, and reuse

My research focuses on host-virus interactions, especially as it relates to the consequences of infection. For the past several years I have studied the chloroviruses, which are evolutionarily related to other large DNA viruses, such as asfar, asco, irido, marseille, mimi and pox viruses; collectively known as “giant viruses”. We are investigating many aspects of chloroviruses including the virion structure and function; genome structure, function and evolution; metabolic changes associated with infections, as well as the role of algal viruses in aquatic ecosystems. We collaborate with a team of researchers at the Johns Hopkins University regarding the extraordinary observation they made when evaluating post mortem brains from individuals with serious mental disorders: individuals with psychiatric disorders tend to have chlorovirus sequences in the brain. Our role has been to evaluate the natural history to address the issue of the likelihood of humans coming into contact with chloroviruses. In addition to defining the hosts in aquatic systems, we are evaluating a key issue to this linkage, can chloroviruses replicate in mammalian cells and/or tissues?

Lisa Durso

https://agronomy.unl.edu/durso

Research categories: Chemical and microbial risk research including water remediation; nutrient recovery and management

I am interested in solving applied problems related to how agriculture impacts environmental and human health. My research focuses on using animal manure as a fertilizer while minimizing adverse environmental and human health impacts. My current projects address issues associated with pathogens and antibiotic resistance from agricultural settings. I characterize how bacteria and genes from animal manures travel through agricultural production systems, soil, and water. My main projects involve studying the fate and transport of pathogens, fecal indicator organisms, antibiotic resistant bacteria and antibiotic resistance genes, in runoff from feedlots and runoff from manure-amended fields. I use the tools of microbial ecology to profile microbial communities, and determine how “problem” microbes or “problem” genes interact with all of the naturally occurring microflora in agriculturally impacted environments.

Bruce Dvorak

https://engineering.unl.edu/civil/bruce-dvorak/

Research categories: Water pollution; water/wastewater quality, management, and reuse; sustainable water infrastructure; water and energy nexus

Areas of research and professional interest: Environmental Engineering, Physical-chemical treatment processes, Life Cycle Assessment, Pollution prevention/environmental sustainability for industry

John Gamon

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=1893

Research category: Water-relevant research in earth sciences and atmospheric sciences

I study the "breathing of the planet" - the exchanges of carbon and water vapor between the biosphere and the atmosphere that affect ecosystem productivity and help regulate our atmosphere and climate. Of particular interest are the effects of disturbance (stress, fires, succession, weather events and climate change) on these basic processes. Additional research questions involve the detection of plant physiology, ecosystem function, species composition, and biodiversity using non-contact sampling methods. Much of this work is done with optical monitoring (remote sensing and automated field methods), and entails the development of new monitoring methods and related informatics tools.

Troy Gilmore

https://bse.unl.edu/faculty/troy-gilmore

Research category: Hydrology

Areas of research and professional interest: Groundwater-surface water interaction, Image-based hydrology, Groundwater transit time distribution and mean from streambed measurements, Aquifer nitrate legacy and dynamics, Instrument development

Erin Haacker

https://eas.unl.edu/erin-haacker

Research categories: Modeling water systems; water-relevant research in earth sciences and atmospheric sciences

Dr. Erin Haacker is an Assistant Professor in the Department of Earth and Atmospheric Sciences at the University of Nebraska-Lincoln. She uses both process-based models and statistical tools to investigate groundwater, with a focus on water supply for irrigated agriculture.

Steve Hu

https://eas.unl.edu/steve-qi-hu

Research category: Water-relevant research in earth sciences and atmospheric sciences

Over the years, I have researched problems in a wide range of subjects from the tropics to the polar region. I developed the theory of low-frequency oscillations in radiative-convective systems, such as the tropical atmosphere, and suggested it as a driving mechanism of the Madden-Julian Oscillation (MJO). This theory has been tested and remains a cornerstone for the MJO. In high latitude regions, I disclosed the physical processes connecting the Arctic Oscillation with the circulation and precipitation anomalies in mid-latitude North America. In recent years, my research focus has been placed at mechanisms for precipitation variations in the central U.S. from intraseasonal to multidecadal timescales. A series of projects was devoted to understanding those variations by remote forcing such as ENSO and the Atlantic Multidecadal Oscillation (AMO). Local effects, from land-use change and effects on regional circulation, are also being examined. An intriguing result from a recent study is that the massive land-cover change in the Great Plains from the pre-settlement to the 1930s is found playing a key role in the 1930s "Dust Bowl" drought. In addition to these large-scale dynamics problems I also developed a convection parameterization for models and have been searching answers to some questions in initiation of nocturnal convection during the warm season in the Great Plains.

Jesse Korus

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=1010

Research categories: Hydrology; modeling water systems

I am a hybrid hydrogeologist/sedimentologist: I conduct interdisciplinary research in the emerging field of aquifer sedimentology. My aim is to understand the influence of subsurface heterogeneity on hydrologic system function and water resource sustainability. Heterogeneity plays a critical role in determining patterns of stream-aquifer interaction, contaminant transport, and groundwater response to land use changes, climate changes, and pumping. I use geophysical tools, field methods, and computer models to produce 3-D renderings of aquifer systems. 3-D models provide insight to the interconnections between the land surface and the subsurface. My current focus is on characterizing the High Plains/Ogallala aquifer system in areas of intensive water use and semi-arid climate, with the goal of improving the physical representation of aquifer heterogeneity in coupled groundwater/surface-water models.

Rebecca Lai

https://chem.unl.edu/rebecca-lai

Research category: Environmental and chemical sciences

Areas of research and professional interest: Electrochemical biosensor design, biomaterials-electrode interface characterization, protein engineering for sensor applications, scanning electrochemical miscroscopy, nanomaterials for energy-related applications

Xu Li

https://engineering.unl.edu/civil/xu-li/

Research categories: Water pollution; water/wastewater quality, management, and reuse; health and water research including climate impacts

Xu Li's research revolves around microbes important to environment quality and public health. By working at the interface of environmental engineering and applied microbiology, his research group aims to advance knowledge on microbial communities relevant to contaminant biotransformation, resource recovery, and antibiotic resistance. He develops technologies and interventions to prevent and minimize pollution of water, soil, and crops and to protect human health from pollution. Specifically, he designs and optimizes engineering systems for drinking water treatment, wastewater reuse, and stormwater management, as well as agricultural practices for manure storage and land application.

Yusong Li

https://engineering.unl.edu/civil/yusong-li/

Research category: Chemical and microbial risk research including water remediation

Areas of research and professional interest: Fate and transport of contaminants, Environmental implication of nanotechnology, Ground water remediation, Numerical simulation at pore and continuum scales

Adam Liska

https://bse.unl.edu/faculty/adam-j-liska

Research category: Water and energy nexus

Areas of research and professional interest: Biofuels, Life cycle assessment, Greenhouse gas emissions, Energy Security

Arindam Malakar

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=2695

Research category: Environmental and chemical sciences

Areas of research and professional interest include:

- Identifying the influence of surface processes in agroecosystems on the occurrence of anthropogenic and geogenic contaminants in the critical zone.
- Developing vadose zone-centric technologies to mitigate groundwater pollutants.
- Integrate experimental and modeling approaches to understand nanoscale hydrogeochemical transformation in the root-pore water-soil system.

Taro Mieno

https://agecon.unl.edu/faculty/taro-mieno

Research category: Economics and policy relevance in water sciences

Areas of research and professional interest: precision agriculture and water resource management

Dan Miller

https://agronomy.unl.edu/miller

Research categories: Water/wastewater quality, management, and reuse; nutrient recovery and management

Modern agriculture faces many challenges relating to the accumulation, handling, storage, and application of animal manure. Current research project activities include evaluating alternative feedlot runoff treatment systems, investigating the controls on gas emission hot-spots in cattle feedlots, understanding microbial nutrient transformations in shallow aquifers, and documenting odor compound emissions from cropland receiving animal manure. A variety of collaborations with university and other ARS locations enable a multi-component approach that provides additional information related to the fate of pharmaceuticals, manure pathogens, and nutrients in these projects.

Aaron Mittelstet

https://bse.unl.edu/faculty/aaron-mittelstet

Research categories: Water pollution; modling water systems

Areas of research and professional interest: Watershed modeling, surface/groundwater interaction, water quality, and streambank erosion.

Francisco Munoz-Arriola

https://bse.unl.edu/faculty/francisco-mu%C3%B1oz-arriola

Research categories: Water pollution; sustainable water infrastructure; modeling water systems; water research linked to climate change and sustainability including remote-sensing applications

My academic and professional experiences encompass diagnostics and sub-seasonal to seasonal prognostics of extreme hydrometeorological and climate events, and their effects on infrastructure (i.e., water resources, agriculture, and ecosystem services).

In the natural and built environment, for example, water quality and quantity are components of a complex system regulated or exacerbated by extreme hydrometeorological and climate events (EHCEs), fluctuating markets, technological developments, social behaviors, and evolving policies and decision making. Thus, the (re)design and management of resilient water infrastructure in a non-stationary world demands a better understanding of the underlying principles that enable water to maintain their core functions across geospatial attributions and management scales.

Siamak Nejati

https://engineering.unl.edu/chme/faculty/siamak-nejati/

Research category: Water pollution

Dr. Nejati's research interest centers on polymeric materials and thin films. He strives to develop economically viable and advanced methods for addressing the current challenges to water and energy supplies and security.

Christopher Neale

https://bse.unl.edu/faculty/christopher-neale

Research categories: Water research linked to climate change and sustainability including remote-sensing applications; water and energy nexus

Areas of research and technical specializations: Applied Remote Sensing from satellite and airborne systems in the visible, near infrared, thermal infrared and microwave portions of the electromagnetic spectrum. The use of airborne multispectral imagery for monitoring and mapping river corridors, riparian vegetation, wetlands, natural resources, irrigated agriculture. GIS applications in engineering, including development of irrigation water user cadastre maps and database for water user organizations. Irrigation water management and water demands estimates. Irrigation and Drainage Engineering. Evapotranspiration measurements with lysimeters, Bowen ratio, eddy covariance and

scintillometer systems. Remote sensing of energy balance components and Evapotranspiration. Development of crop coefficients including remote sensing approaches. Precision agriculture and crop yield estimation using remote sensing and GPS equipment.

Santosh Pitla

https://bse.unl.edu/faculty/santosh-pitla

Research category: Applications of data sciences, AI, and machine learning to water research

Areas of research and professional interest: Agricultural Robotics, Agricultural Equipment Logistics, Embedded Control Applications in Machine Automation, Unmanned Ground and Aerial Applications in Agriculture

Wei Qiao

https://engineering.unl.edu/ece/faculty/wei-qiao/

Research category: Water and energy nexus

Areas of research and professional interest include:

- Modeling, design, prognostic condition monitoring, control, and optimization of renewable energy systems, power electronic systems, energy storage systems, and electric motor drives
- Emerging electrical energy conversion devices
- Power and energy system control and optimization
- Decision making and risk management in the electricity markets with high penetrations of renewable energy
- New electricity market design
- Modeling and control of complex systems

Byrav Ramamurthy

https://cse.unl.edu/~byrav/byrav.html

Research category: Applications of data sciences, AI, and machine learning to water research

Areas of research and professional interest include optical and wireless networks, peer-to-peer networks for multimedia streaming, network security and telecommunications.

Clinton Rowe

https://eas.unl.edu/clinton-rowe

Research category: Water-relevant research in earth sciences and atmospheric sciences

My major research area is in physical meteorology and climatology, specifically the fluxes of energy and mass between the surface and the atmospheric boundary layer. Much of my research has focused on radiative fluxes between vegetated surfaces and the atmosphere, but I have also conducted modeling and field studies investigating energy exchanges over the Greenland ice sheet and their impact on the amount and extent of surface melting. I am currently involved in several research projects concerning land surface-atmosphere interactions in the Nebraska Sand Hills. One of these is investigating how the Sand Hills' unique soil properties affect generation of warm-season mesoscale precipitation over the Sand Hills and surrounding plains. Our findings show that the Sand Hills have a complex set of effects on the atmosphere — in some cases acting to inhibit convective precipitation while in others acting to enhance convection and precipitation generation in the region. These investigations were part of a large, multi-investigator NSF grant to study the Sand Hills as a complex ecosystem. This team of researchers included ecologists, physicists, geologists, hydrologists and meteorologists.

Tirthankar Roy

https://engineering.unl.edu/cee/faculty/tirthankar-roy/

Research category: Hydrology; water research linked to climate change and sustainability including remote-sensing applications; applications of data sciences, AI, and machine learning to water research

Areas of research and professional interest: Water Resources Development, Statistics in Hydrology, Surface Water Hydrology, Water Resources Engineering, Data Science in Hydrology

Ashok Samal

https://computing.unl.edu/ashok-samal/

Research category: Water research linked to climate change and sustainability including remote-sensing applications; applications of data sciences, AI, and machine learning to water research

Geospatial Data Analysis and Spatial Data Mining: Parsing the spatial organization to derive higher level features is a difficult challenge in geographic computation. We have developed techniques to extract these structures in their geographic contexts and exploit them for important problems including conflation and satellite image retrieval. My contribution in spatial data mining has been in explicitly incorporating the properties of the geographic space into the clustering algorithms; traditional clustering techniques are ineffective in the geospatial domain.

Amy Schmidt

https://bse.unl.edu/faculty/amy-schmidt

Research category: Nutrient recovery and management

Areas of research and professional interest: Nutrients fate and transport, Pathogen fate and transport, Water quality, Manure management, Nutrient management

Karina Schoengold

https://agecon.unl.edu/faculty/karina-schoengold

Research category: Economics and policy relevance in water sciences

Areas of research and professional interest: Natural resource economics, water resources, technology adoption, policy analysis, ecosystem service valuation, risk management

Anthony Schutz

https://law.unl.edu/anthony-schutz/

Research category: Economics and policy relevance in water sciences

Professor Schutz's research interests include the often intertwined subjects of agricultural law, environmental and natural resources law, and state and local government, all of which have significant impacts on rural landscapes and populations. Professor Schutz has served as the chair of the AALS Section on Agricultural Law, is active in the American Agricultural Law Association and the Rocky Mountain Mineral Law Foundation, and is a frequent lecturer on agricultural and water law issues regionally and nationally. He tries to keep a close eye on the legislature and encourages students to speak up and take part in the legislative process, both while they are here and in their professional lives going forward.

Daniel Snow

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=302

Research categories: Environmental and chemical sciences; water pollution; water/wastewater quality, management, and reuse

I use analytical chemistry to help understand how water becomes contaminated and what we can do to prevent it. A good part of my work in the Water Sciences Laboratory involves creating analytical methods for new or "emerging" environmental contaminants like steroids, pharmaceuticals, algal toxins, explosives and pesticides. I also help develop methods to measure and use stable isotopes as tracers to study environmental problems and processes.

Mass spectrometry is an incredibly powerful tool to use in studying the occurrence and environmental fate of chemicals, and their potential for affecting organisms and people. Students and staff I supervise use mass spectrometers to help other scientists and engineers find out exactly what chemicals are in water and other materials. I work with biologists - studying endocrine disruption in fish in Nebraska rivers - to find out what kinds and concentrations of steroid hormones and pesticides may be associated with these effects. I also work with scientists and engineers to find out what kinds and concentrations of steroid hormones and pharmaceuticals may be found in livestock and municipal waste, and whether or not these chemicals can get into water.

Mark Svoboda

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=584

Research category: Water-relevant research in earth sciences and atmospheric sciences

Areas of research and professional interest: Climatology, Drought, Water management, Impacts, Drought Early Warning Information Systems, Drought Monitoring

Tsegaye Tadesse

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=232

Research category: Water-relevant research in earth sciences and atmospheric sciences

Areas of research and professional interest: Drought monitoring, Seasonal weather prediction, Natural resource management, Team leadership and development, Climate change and variability, Human

impacts on the environment, Remote sensing/GIS, Data mining and risk management, Weather, Hydrogeology, Land Use / Land Cover

Zhenghong Tang

https://www.unl.edu/ztang2/about-me

Research category: Water pollution; Applications of data sciences, AI, and machine learning to water research

With a keen research interest in environmental planning, hazard mitigation, and geospatial science and technology, Dr. Tang's scholarly work revolves around the integration of local planning tools with strategic environmental management and hazard mitigation. His research agenda encompasses three primary research categories: Promoting “integrated planning” approach to improve state and local planning capacity for extreme hazards, community resilience, and sustainable development; Developing geospatial information platforms with machine/deep learning algorithms/Artificial intelligence (Geo-AI) for precision conservation and environmental management; and Planning for mobile-enabled society through incorporating crowdsourcing data, citizen science, and mobile devices for environmental data sharing, visualization, and decision making.

Eric Thompson

https://business.unl.edu/people/ethompson

Research category: Economics and policy relevance in water sciences

Dr. Thompson has conducted a broad group of economic impact studies including impact studies of Nebraska agriculture, Sandhill Cranes migration, the Nebraska childcare industry, the Omaha Zoo, the Nebraska horseracing industry, Husker Harvest Days, and the UNL Athletic Department. Dr. Thompson also works on demographic projections and analyses of economic development programs for Nebraska and cities in Nebraska. He also has conducted numerous economic impact studies for the Lincoln Department of Economic Development, the Omaha Chamber of Commerce, the Nebraska Department of Economic Development, various Nebraska industries, and Nebraska tourism attractions.

Liz Van Wormer

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=1929

Research category: Health and water research including climate impacts

In the United States and East Africa, my research, teaching, and outreach address diverse health issues at the interface of humans, animals (both domestic and wild), and the environment. As an epidemiologist, I integrate animal and human disease surveillance, molecular epidemiology, and spatial disease modeling methods to investigate zoonotic disease transmission. Using a One Health approach, I work with students, multi-disciplinary researchers, and non-academic stakeholders, linking diverse tools and perspectives to address complex health challenges.

Harkamal Walia

https://agronomy.unl.edu/walia

Research category: Water-relevant research in earth sciences and atmospheric sciences

Unfavorable environmental conditions such as drought, high and low temperature stress, salinity, and flooding result in heavy crop yield losses in the U.S. and worldwide. These stressful conditions are increasingly associated with a shift in agriculture to marginal lands and erratic climatic changes. My research interest is in understanding how plants adapt to these environmental stresses. I am particularly interested in the physiological and molecular characterization of crop responses to drought, heat and salt stress. Plant responses to stress depend on the developmental stage at which the stressful conditions arise.

Brian Wardlow

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=784

Research category: Water research linked to climate change and sustainability including remote-sensing applications

My selection of a career path in the field of remote sensing stems from interests in agriculture and natural resources that I developed growing up in small-town Nebraska, and during my academic training in environmental geography and GIScience. The remote sensing perspective from satellites and aircraft offers a unique vantage point to study key ecological and environmental patterns and processes across the landscape. As a result, my primary research focus has been to apply remote sensing as a tool to acquire critical information needed to better understand and address agricultural, environmental, and natural resource issues.

My current remote sensing research is centered on three predominant themes:

- classifying and mapping land use/land cover (LULC) patterns of agricultural landscapes
- characterizing vegetation dynamics such as phenology and biophysical characteristics, and
- drought monitoring and early warning.

Karrie Weber

https://biosci.unl.edu/karrie-weber

Research category: Environmental and chemical sciences; chemical and microbial risk research including water remediation

Environmental microorganisms are recognized to enzymatically mediate biogeochemical cycles in marine and terrestrial aquatic and soil/sedimentary environments, thereby shaping our environment. The fate and transport of inorganic and organic natural and contaminant compounds can be directly or indirectly regulated by microbial metabolism(s). My research interests focus on the intricate interactions between microorganisms (including viruses) and the environment at the molecular scale, the ecosystem scale, and ultimately, the global scale. I have applied and will continue using an interdisciplinary approach in order to link the microbial community to biogeochemical function combining environmental microbiology, microbial physiology, molecular biology, microbial ecology, geomicrobiology, virology, and biogeochemistry.

Jeffrey Westrop

https://snr.unl.edu/aboutus/who/people/faculty-member.aspx?pid=2646

Research category: Environmental and chemical sciences

My research involves investigating how interactions between sediments, water, and microorganisms can influence water quality. I spent 5 years studying the occurrence and mobility of uranium in the High Plains Aquifer as part of my PhD. Soon after graduating, I accepted a position as an Assistant Geoscientist at the Nebraska Conservation and Survey Division. I plan on continuing my work on uranium mobility in the High Plains while applying my expertise in geochemistry to new problems including soil health and how groundwater chemistry can impact the lifespan of agricultural equipment.

TEXAS TECH UNIVERSITY

Krishna Jagadish, PhD

Professor, Thornton Distinguished Chair, Director of the Davis College Water Center
Link to page: Welcome to Dr Krishna Jagadish's Water Conservation Website, Plant and Soil Science, TTU

Research Category – Groundwater withdrawals and water conservation

Interest: My lab's interest is to develop new tools or approaches to quantify changes in groundwater withdrawals and opportunities to encourage increased water conservation to extend the lifespan of the Ogallala aquifer. Specifically, my lab would be interested to host students or researchers on these following research categories: 1) Groundwater quality assessment and management; 2) Groundwater withdrawal and water conservation; 3) Health impacts of water quality; 4) Methods for measuring water quality; 5) Non-point source pollution and rural drinking water quality; and 6) Remote sensing applications for monitoring water quantity and quality. The students will assist with investigating how pumping capacity (quantity), and water quality impacts crops and forage production, and develop novel ground-proximal-satellite sensing approaches to enhance water productivity and conserve underground water.

Laboratory: Dr. Jagadish coordinates a unique producer-based learning network TAWC (Texas Alliance for Water Conservation) that has worked directly with 35+ producer farms involving 6,000+ acres in 9 Texas counties, between 2005 and 2022. This provides an interesting opportunity to assess some of the tools or approaches developed on real-world production systems. Also, as the Director for the Davis College, developed multiple trans-disciplinary teams between eight different departments in the college including economics, plant and soil science and others to address complex water quantity and quality related challenges on producer operations. Additionally, the team is engaged with multiple sensor-based companies and with an interest in integrating ground and satellite-based imagery, students will have the opportunity to work on multiple sensor-based opportunities to enhance water use efficiency and water conservation in the region.

Angela M. Shaw, PhD

Professor, Animal and Food Sciences
Link to page: Welcome to Dr. Angela Shaw's Food Safety Website | Angela Shaw | Animal and Food Sciences | TTU

Research Category: Intervention strategies to reduce foodborne pathogens within water systems

Interest: My interest in this program lies in water safety with a microbiology focus. Specifically, I seek students who have an interest in the following research categories: 1) Groundwater quality assessment and management; 2) Methods for measuring water quality; 3) Understanding and protecting water

quality; 4) Wastewater quality and management; 5) Water pollution; and 6) Water supply and sanitation. Within my laboratory, students will be asked to assist with developing new methodologies for foodborne pathogen testing within water systems, conducting risk assessments of water systems, and identifying interventions to improve water quality.

Laboratory: Shaw laboratory is housed under the International Center for Food Industry Excellence (ICFIE) Food Microbiology group. ICFIE comprises faculty members across food-related disciplines that provide innovation, research, and technology transfer across four pillars (Food Access, Availability, Stability, and Utilization) of food security both domestically and internationally. Dr. Shaw focuses on fruits and vegetables, post-harvest handling, water, supply chain, grocers, and food manufacturing of FDA-regulated products. Dr. Shaw's research program has three main themes: 1) Characterizing foodborne pathogen's survival within the food production environment; 2) Establishing research-based food safety interventions against foodborne pathogens within the food environment; and 3) Developing, implementing, and evaluating educational strategies to change food safety risky behaviors, attitudes, and motives.

Aaron Norris, Ph.D.

Assistant Professor, Natural Resources Management
Welcome to Dr. Aaron Norris webpage, Natural Resources Management, TTU

Research category: Water management to enhance forage production and ensure animal health.

Interest: My interest in this program lies in water management with a focus on crops and grazinglands. Specifically, I seek students who have an interest in the following research categories: 1) Groundwater quality assessment and management; 2) Wastewater quality and management; 3) Health impacts of water quality; 4) Understanding and protecting water quality; and 5) Water pollution. Within the laboratory, students will assist with investigating how water from different sources and of various quality influence plant production, potential plants for remediation purposes, and how low-quality water influences livestock feedstuffs.

Laboratory: Norris laboratory is housed within the Natural Resources Management Department at Texas Tech University. Dr. Norris' research is broadly focused on 1) Improving grazing livestock health and efficiency through livestock and grazinglands management; 2) Increasing whole system efficiency through the integration of crop and livestock; 3) Establishing production systems to fill niches that can maximize resource efficiency. Research within the laboratory ranges from native and agronomic forage establishment and management to determining how forage management influences forage nutrition and animal health to evaluating animal behavior and feed/water intake.

W. Shane Walker, Ph.D., P.E.

Professor, Department of Civil, Environmental, & Construction Engineering
Director, Water Resources Center
Link to page: https://www.depts.ttu.edu/ceweb/faculty/shane_walker/index.php

Research Category – Water treatment

Interest: Our team is interested in innovating and evaluating treatment technologies to improve the sustainability of water for cities, agriculture, and industry. Our team is interested in developing and advancing technologies for (1) brackish groundwater desalination for drinking water production, (2) potable reuse of municipal wastewater effluent, (3) reuse of treated produced water, and (4) and recovery of resources from water streams.

Laboratory: The Walker lab is located in the Civil, Environmental, & Construction Engineering (CECE) building in the Engineering Key at Texas Tech University. The Walker lab is part of the Water Resources Center which has a broad set of water quality analytical instrumentation including simultaneous ion chromatography (cations and anions), inductively coupled plasma optical emission spectroscopy, alkalinity titration, gravimetric total dissolved solids, and others. Laboratory-scale reverse osmosis and electrodialysis experimental units are utilized to evaluate constituent removal efficacy, water recovery limits, and energy efficiency of hybrid desalination processes.

Amrika Deonarine, Ph.D.

Assistant Professor, Department of Civil, Environmental, & Construction Engineering
Link to page: https://www.depts.ttu.edu/ceweb/faculty/amrika_deonarine/index.php

Research Category – Biogeochemistry and recovery of aqueous metals

Interest: Our team is interested in (1) speciation, (2) biological and physical-chemical transformations, and (3) fate and transport of trace metals (arsenic and mercury) in environmental and geological waters. Our team is interested in characterizing water quality dynamics in managed aquifer recharge (MAR) and aquifer storage and recovery (ASR), as well as recovery of rare earth elements (REEs) from natural and industrial waters.

Laboratory: The Deonarine lab is located in the Maddox Engineering Research Center (MERC) building in the Engineering Key at Texas Tech University. The Deonarine lab is part of the Water Resources Center which has a broad set of water quality analytical instrumentation including inductively coupled plasma mass spectrometry (ICP-MS) for trace element speciation and quantification.

Kaleigh Millerick, Ph.D.

Assistant Professor, Department of Civil, Environmental, & Construction Engineering
Link to page: https://www.depts.ttu.edu/ceweb/faculty/Kayleigh_Millerick/index.php

Research Category – Microbiological water treatment

Interest: Our team is interested in (1) the microbiological transformations of organic pollutants and (2) microbiological conversion of nitrogen and phosphorous containing biological materials from domestic and agro-industrial wastewaters into fertilizer feedstocks.

Laboratory: The Millerick lab is located in the Maddox Engineering Research Center (MERC) building in the Engineering Key at Texas Tech University. The Millerick lab is part of the Water Resources Center which has a broad set of water quality analytical instrumentation including glove boxes for controlled redox-state microbiological experimentation, as well as microbiological genetic and community characterization.

Ali Mirchi

https://experts.okstate.edu/amirchi

Dr. Ali Mirchi is an Associate Professor at the Department of Biosystems and Agricultural Engineering at Oklahoma State University (OSU). He teaches courses in different areas of water resources engineering and management. Dr. Mirchi's research focuses on water resources planning and management, hydrologic engineering, and systems modeling to inform resource management frameworks, and derive policy insights that promote sustainability. He applies systems thinking, systems analysis techniques, geographic information systems (GIS), simulation, and optimization modeling to advance understanding of coupled human-natural systems at different scales. Dr. Mirchi is currently working on two interdisciplinary research projects in the Rio Grande region and South Florida, USA, investigating water resources management strategies in the face of continuous growth, competing demands, and climate change. Prior to joining OSU, Dr. Mirchi was a Research Assistant Professor at the Department of Civil Engineering and Center for Environmental Resource Management at the UT El Paso.

Kevin Wagner

https://experts.okstate.edu/kevin.wagner

Dr. Wagner serves as the Director of the Oklahoma NSF EPSCoR Program and Director of the Oklahoma Water Resources Center at Oklahoma State University. As Director of the Water Center, he provides leadership and administration of the Center's water research, outreach, education, and grant programs; leads Center efforts to increase engagement with the water resources community across Oklahoma and the U.S.; and facilitates development of inter-disciplinary teams to address high priority water resources issues. As Director of the EPSCoR Program, he provides leadership and administration of a large multi-institutional and multi-disciplinary research team aimed at finding *Socially Sustainable Solutions for Water, Carbon, and Infrastructure Resilience in Oklahoma*.

Dr. Wagner also engages in water resources research focused on enhancing (1) stakeholder engagement through better integration of scientific information with human systems for application to water resources policy and management; (2) watershed assessment, planning, management, and sustainability; (3) understanding of water use and adoption of conservation practices; and (4) private lands stewardship through assessing and improving conservation practice effectiveness and identifying/overcoming barriers to adoption.

Suranjan Panigrahi

https://polytechnic.purdue.edu/profile/spanigr

Research Category: Methods for measuring water quality, Health impacts of water quality

Dr. **Suranjan Panigrahi** is an internationally recognized professor in the Department of Electrical and Computer Engineering Technology, He has 30 years of comprehensive experience in research, teaching (learning), administration, and outreach. He is a scholar of engineering & advanced technologies, a real-world solution architect, an innovator, an educator, and a higher-education leader.

He has cross-disciplinary training and research expertise in engineering design, artificial intelligent technologies, biological systems, sensors, automation & control, electronics, information technologies and management science (via MBA). At present, he directs a multi-disciplinary research laboratory "Integrated Sensing and Smart Solutions Laboratory" at Purdue University. He is the lead inventor of three approved U.S. patents (related to field scale quality sensors) that were milestone patents in the field of precision farming and big data in agriculture. He is the author/co-author of more than 180 technical papers, publications, book chapters including patents and software. His papers and scholarly contributions have 3710 citations with the h-index of 31 and the i10-index of 56. Before joining Purdue, he was a full-professor (tenured) in both the Colleges of Engineering and Agriculture at North Dakota State University (NDSU), Fargo, USA. He was the founder-director of a multidisciplinary research center “Bio-Imaging and Sensing Center” at NDSU and served as its director for 9 years. During his tenure at NDSU and Purdue. Dr. Panigrahi has launched multiple interdisciplinary projects that created solutions for different critical societal challenges related to agricultural production, precision agriculture, food safety & quality, environmental health, health informatics, and human health & wellness.

He has exercised his visionary skills in research & development activities while pioneering technological developments and translations that were 18-20 years ahead of their time. In this process, he has collaborated with researchers, scientists, decision-makers, students, staff and other stakeholders from universities, industries, and private organizations. This has resulted in training post-doctoral associates, technical staff members, graduate (M.S. & Ph.D.) as well as undergraduate students. A total of 43 M.S. and Ph.D. students have successfully graduated under the supervision of Dr. Panigrahi. Another 13 post-doctoral associates have completed their training with Dr. Panigrahi. His ex-post-doctoral associates and

ex-Ph.D. students are now working as tenured (tenure track) faculty members in U.S. universities, as technical leaders in industries, and as entrepreneurs. He has hired (with pay) many undergraduate part-time researchers in his lab to obtain hands-on experience while working on relevant research projects.

Adopting a systems-based approach, he and his group created a framework "SWADIN" (Sustainable Solution With Appropriate Technological Development and Innovation" for solving real-world societal issues while operating in a solution-domain, appropriate for a given location or region. Within this SWADIN framework, one of his group's research thrusts focuses on creating technological innovations for water-linked health and wellness that affect people (including elderly populations, mothers and children) in different countries (including India). In 2013, a bilateral workshop was conducted in Kharagpur, India in collaboration with IIT Kharagpur. Participants from UNICEF, NGO, Government organization also participated (https://docs.lib.purdue.edu/swadin/2013/).

His group has successfully developed sensors to detect Arsenic and Lead (Pb) in water as part of an international project with Peru, South America. In collaboration with IIT, Benares, India, he and his collaborator created green chemistry-linked methods involving nano-technology-based sensors for detecting ammonia in water. In parallel, they are also investigating how food and water-based contaminants affect human health including liver diseases.

For the WARI initiative, we are interested to work with the attendee (s) to develop collaborative solutions (involving sensor and information technology) on water related problem (s) that is of significance to both India and USA (including the larger framework of global water issues).

Dharmendra Saraswat

https://dad.saraswat.rcac.purdue.edu/

Research Category: Remote sensing applications for monitoring water quantity and quality

Dr. Dharmendra Saraswat is a professor in the Agricultural and Biological Engineering Department at Purdue University. He received a bachelor's degree in agricultural engineering from the University of Allahabad; a master's degree in agricultural engineering from the Indian Agricultural Research Institute (IARI), New Delhi and a Ph.D. degree in food, agricultural and biological Engineering from The Ohio State University.

Prior to coming to Purdue, Dr. Saraswat was a faculty member at the University of Arkansas, a scientist at the Indian Council of Agricultural Research, New Delhi, India and an assistant professor at Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, India.

Dr. Saraswat's research focus is on using information, communication, and sensing technologies (ICSTs) to address challenges in plant production (field and nursery crops) and natural resource management. He accomplishes research goals through innovative ICST applications and multidisciplinary collaborations with colleagues within and outside Purdue University.

Dr. Saraswat's overall research and extension efforts have been recognized both nationally and internationally on a sustained basis. He has received several awards including Fulbright-Nehru U.S. Scholar Award (2023-2024), Excellence in Multistate Research Team Award from USDA-NIFA for S1069 project (2022), Outstanding Faculty Mentor Award from Purdue ABE (2022), Outstanding Educator Award by SHUATS (2021), American Society of Agricultural and Biological Engineers (ASABE) ITSC Best Paper Award (2019), Outstanding Engineering Teacher for Fall by Purdue College of Engineering (2019), ASABE Standards Award (2018), ASABE Educational Aids Blue Ribbon Award (2017, 2015 and 2013), American Society of Horticultural Sciences (ASHS) Outstanding App Award (2016), Southern Region-American Society of Horticultural Sciences Blue Ribbon Extension Communication Award (2016 and 2012), Fellow of Indian Society of Agricultural Engineers (2014), John W. White Outstanding Extension State Faculty Award by the University of Arkansas (2014), Excellence in Remote Sensing and Precision Agriculture Award from National Association of County Agricultural Agents(2013), ASABE Superior Paper Award (2012), Early Career Award (2011) and Innovation Award (2011) from the University of Arkansas.

Maria S. Sepúlveda

https://www.purdue.edu/fnr/sites/sepulveda/

Research Category: Ecological and human health impacts of pollutants and emerging contaminants

Dr. Maria S. Sepúlveda is Professor of Ecotoxicology and Aquatic Animal Health at Purdue University. She earned a Doctorate in Veterinary Medicine degree from Universidad de Chile, Santiago, Chile; her Master of Science degree from University of Florida, Gainesville, Florida (Wildlife Ecology); and her doctorate from the same University (Veterinary Sciences). Dr. Sepúlveda's main area of research is ecotoxicology. Over the last 20 years, she has conducted extensive research evaluating the sublethal effects of a wide-range of environmental contaminants on the physiology of numerous aquatic species. Dr. Sepúlveda's main area of interest involves studying the health effects of environmental contaminants in populations of free-ranging fish and wildlife. Specifically, Dr. Sepúlveda's research has focused on understanding the effects of pollutants on reproduction and early life-stage development. Besides examining whole animal and tissue-level responses to environmental contaminants, Dr. Sepúlveda also investigates the effects of chemicals at the sub- cellular and molecular levels. She has published over 130 refereed publications, authored 9 book chapters, and presented her research in multiple invited lectures and presentations at national and international conferences. She has advised 16 graduate students (11 Ph.D.) and is currently advising 1 Ph.D. student.

Meetpal S. Kukal

https://scholar.google.com/citations?user=rGZM1SAAAAAJ&hl=en

Mkukal@uidaho.edu

Incoming Assistant Professor of Hydrologic Science and Water Management
Department of Soil and Water Systems
University of Idaho-Boise
322 E Front St. Boise, ID 83702

Research category: Hydrology; Modeling water systems; Water research linked to climate change and sustainability including remote-sensing applications; Applications of data sciences, AI, and machine learning to water research

Dr. Kukal is an Assistant Professor of Hydrologic Science and Water Management at University of Idaho-Boise campus. Dr. Kukal conducts applied research, teaching, and outreach in agrohydrology and agricultural water management, hydroclimatology, and soil-plant-atmospheric relations at plot to regional/national scales. In his work, he integrates principles from water and irrigation science, plant physiology, biometeorology, environmental biophysics, agricultural engineering, and agronomics to address questions that lie on the intersection of agriculture, water, and climate. His group employs both measurements (in situ, proximal, and remote) as well as modeling (data-driven and process-based) approaches to assess and predict crop and water budgets' response to global change elements and management regimes. He has published more than 50 peer-reviewed research and extension/outreach articles. He is currently leading two USDA-funded projects on hydrologic impacts of climate-smart agriculture.