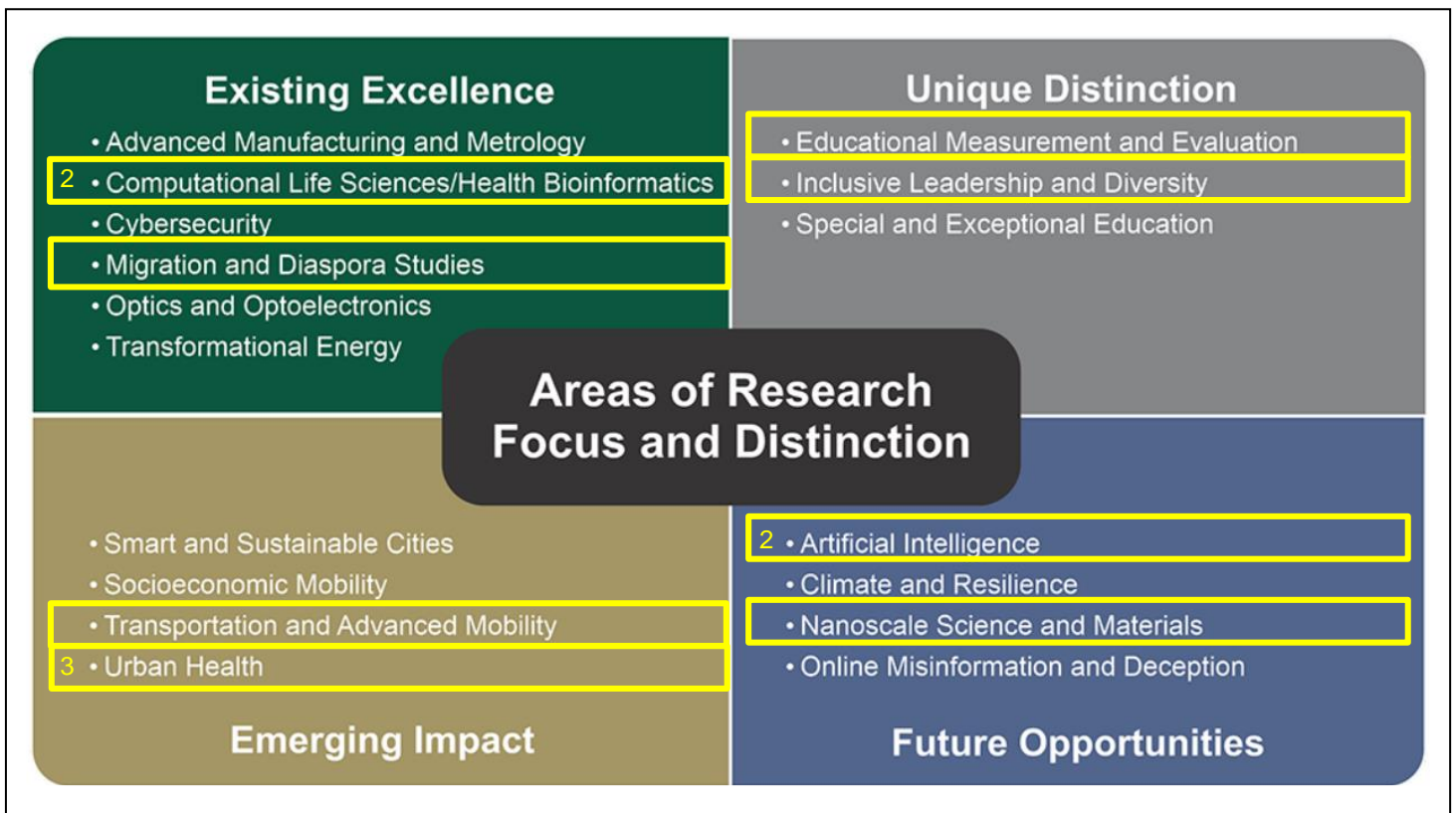


UNC CHARLOTTE’S NEWEST PILOT CENTERS AND ESTABLISHED SYSTEM-APPROVED CENTERS: AREAS OF RESEARCH DISTINCTION

In partnership with (and matching funds from) the colleges, the Division of Research invested in and launched 12 pilot centers in summer 2023 to complement the 11 existing system-approved centers across UNC Charlotte. Collectively, these represent hubs of research excellence collaboratively bringing faculty together to seek solutions to societal challenges. The Ignite Pilot Centers initiative builds on the “Roadmap to Research Top-tier” Report, positioning us to achieve the “Shaping What’s Next” Strategic Plan’s aspirations for very high research activity by fostering connectivity between faculty, staff, students, colleges, and department/programs. All colleges are represented in both lead and participating roles in the pilot centers, which map to the “Areas of Research Focus and Distinction,” as illustrated in the diagram.

These dynamic, inclusive pilot centers and system-approved Centers offer opportunities for partners to topically access clusters of researchers on campus and for faculty, students, and staff to connect and find a welcoming research community.



Fully Supported:

Track 1 (new pilot centers):

- Center for Leadership Science (Lead: Belk College of Business; Participating: College of Computing and Informatics, College of Humanities & Earth and Social Sciences)
- Center for Environmental Monitoring and Informatics Technologies for Public Health (CEnMoIT) (Lead: College of Computing and Informatics; Participating: The William States Lee College of Engineering, College of Humanities & Earth and Social Sciences, College of Science)
- Center for Innovation, Translational Research and Applications of Nanostructured Systems (CITRANS) (Lead: College of Science; Participating: The William States Lee College of Engineering)
- Center for Science, Technology, Engineering and Mathematics Education (CSTEM) (Lead: Cato College of Education; Participating: College of Science, The William States Lee College of Engineering, College of Computing and Informatics, College of Humanities & Earth and Social Sciences)

Track 2 (seed grants to existing UNC System Centers at UNC Charlotte):

- Charlotte Aviation Innovation and Research Institute (Lead: The William States Lee College of Engineering; Participating: College of Humanities & Earth and Social Sciences, College of Computing and Informatics)
- CIPHER (Lead: College of Computing and Informatics; Participating: College of Sciences, College of Health & Human Services, Cato College of Education, College of Humanities & Earth and Social Sciences)

Partially Supported:

Track 1:

- AI Center for Human Digital Twin and Computational Health (Lead: College of Computing and Informatics; Participating: College of Health & Human Services, The William States Lee College of Engineering)
- UNC Charlotte Violence Prevention Center (Lead: College of Health & Human Services; Participating: College of Humanities & Earth and Social Sciences, Urban Institute)
- Center for Migration and Diaspora Studies (Lead: College of Humanities & Earth and Social Sciences; Participating: Cato College of Education)
- Center for Community-engaged Arts and Design Research (CADRe) (Lead: College of Humanities & Earth and Social Sciences; Participating: College of Arts + Architecture)
- Charlotte Center for Trustworthy AI for Model Risk Management (TAIM2) (Lead: College of Science; Participating: School of Data Science, College of Computing and Informatics, College of Humanities & Earth and Social Sciences)
- Center for Community, Heritage, and the Arts (CHArt) (Lead: College of Arts + Architecture)
- Center for Education Measurement and Evaluation (CEME) (Lead: Cato College of Education)

Track 2:

- Center for Applied Geographic Information Science (CAGIS), Geospatial Sensing and Analytics (GeoSAN) (Lead: College of Humanities & Earth and Social Sciences; Participating: College of Computing and Informatics, The William States Lee College of Engineering, Belk College of Business)

AI CENTER FOR HUMAN DIGITAL TWIN AND COMPUTATIONAL HEALTH

Principal Investigator:

- Pu Wang, Department of Computer Science (Pu.Wang@charlotte.edu)

Senior Personnel:

- Ahmed Helmy, Razvan Bunescu, Minwoo Lee, Srinivas Akella, Xiang Zhang, Srijan Das, Min Shin, Aidong Lu, Dong Dai, Liyue Fan, Wenhao Luo, Department of Computer Science
- Yaorong Ge, Department of Software and Information Systems
- Abbey Fenwick, Joseph S. Marino, and Luke Donovan, Department of Applied Physiology, Health, and Clinical Sciences
- Kelly Powers and Meredith Troutman-Jordan, School of Nursing
- Naiquan (Nigel) Zheng, Department of Mechanical Engineering and Engineering Science

The AI Institute for Digital Human Twins and Computational Health (AI4HEALTH) aims to revolutionize healthcare by developing and implementing Human Digital Twin (HDT) solutions for computational health. The center brings together a multidisciplinary team of experts in artificial intelligence, data science, healthcare, and life sciences. Our goal is to create a collaborative ecosystem that fosters innovation, knowledge sharing, and the development of cutting-edge AI technologies for healthcare applications. The Institute's research focuses on leveraging AI technologies, such as smart sensing, generative adversarial networks (GANs), physics-informed machine learning, deep reinforcement learning, predictive foundation models, large language models and assistive robots, to create accurate and up-to-date HDTs for individuals. These digital twins will enable personalized, data-driven, and precise healthcare decisions, improving patient outcomes and reducing costs. By building on existing areas of excellence and research strength at UNC Charlotte, the center will contribute to the development of novel healthcare interventions and rehabilitation strategies. Additionally, the center will work closely with industry partners, healthcare institutions, and federal/state program officers to secure funding and drive the adoption of AI technologies in healthcare settings. The Institute also aims to develop a pipeline of talent by offering educational and training programs for students, researchers, and healthcare professionals. Through workshops, conferences, and webinars, the center will disseminate research findings and encourage collaboration among experts in the field. In summary, the proposed center at UNC Charlotte will advance computational health research by fostering collaboration, innovation, and the development of AI technologies for digital twin-driven next-generation healthcare. The center's work has the potential to significantly improve patient outcomes and transform the way healthcare is delivered, making a lasting impact on the lives of individuals worldwide.

CENTER FOR COMMUNITY-ENGAGED ARTS AND DESIGN RESEARCH (CADRE)

Principal Investigator:

- Vaughn Schmutz, Department of Sociology, Organizational Science PhD program (affiliated), and Director of MA program in Interdisciplinary Studies (vschmutz@charlotte.edu)

Senior Personnel:

- Nadia M. Anderson, School of Architecture, Director of the City Building Lab
- CarlosAlexis Cruz, Department of Theatre, Director of MFA in Community-centered Practices (starting Fall 2024), Producing Artistic Director of the Nouveau Sud project
- José Gámez, School of Architecture, Interim Dean, College of Arts + Architecture
- Janaka Lewis, Department of English, Interim Chair, Department of Writing, Rhetoric & Digital Studies, Director of the Center for the Study of the New South
- Candace Miller, Department of Sociology, Organizational Science PhD program
- Beth Murray, Department of Theatre, Coordinator of Theatre Education program

- Jaclyn Piatak, Department of Political Science and Public Administration, Public Policy PhD program
- Margaret Quinlan, Department of Communication Studies, Health Psychology PhD program, affiliated faculty in Public Health Sciences PhD program, Women's and Gender Studies, and Gerontology, Director of Health & Medical Humanities program
- Meg Whalen, Director of Communications and External Relations, College of Arts + Architecture

Community Partners:

- Priya Sircar, Arts & Culture Officer, City of Charlotte; Bernie Petit, Public Relations and Marketing Director, Arts & Science Council; Mike Khoe, Executive Director, Lorien Academy of the Arts

The Center for Community-engaged Arts and Design Research (CADRe) aims to promote and conduct research on the role of the arts and design in: socioeconomic mobility; diversity, equity, inclusion, and accessibility; and community health and revitalization. These interrelated challenges are not only key priorities for private foundations and government agencies; they are acute problems in Charlotte. A 2014 study ranked Charlotte last among the 50 largest US cities in socioeconomic mobility and a 2020 cultural equity report issued by the Arts & Science Council highlighted longstanding, systemic barriers to equitable and inclusive arts participation among African, Latinx, Asian, Arab, and Native American (ALAANA) artists, cultures, and communities. At the same time, many artists and arts programs in Charlotte actively work to address and ameliorate these problems. The cadre of university and community partners involved in the Center have a track record of collaborating to study and promote the role of arts and design in addressing these challenges in Charlotte and beyond. By strengthening existing collaborations and fostering new partnerships, the proposed Center will provide the foundation for large research projects that generate academic insights and practical applications. In doing so, the Center is aligned with many national funding priorities and contributes to existing strengths at UNC Charlotte in the study of socioeconomic mobility, inclusive leadership and diversity, and urban health.

CENTER FOR COMMUNITY, HERITAGE, AND THE ARTS (CHART)

Principal Investigators:

- Emily Makas, Associate Professor of Architectural and Urban History and the founding director of the MS in Architecture concentration in Critical Heritage Studies, School of Architecture (emakas@charlotte.edu)
- Carlos Alexis Cruz, Associate Professor, Physical Theatre and founding Director of the Masters of Fine Arts in Community-Centered Practices, Department of Theatre (ccruzcas@charlotte.edu)

The Center for Community, Heritage, and the Arts (CHArt) aims to strengthen existing collaborations and build new initiatives around faculty and students doing research both globally and locally on the intersections between community, place-making, culture, heritage, and the arts. Organized by faculty from the College of Arts + Architecture in close partnership with colleagues in the College of Humanities & Earth and Social Sciences, CHArt provides a space and an umbrella for interdisciplinary conversations focused on preservation and interpretation of the built environment and specific places through hands-on engagement with communities, their legacies, and performing and visual arts. CHArt brings together UNC Charlotte faculty across two colleges seeking to make Charlotte a known leader in scholarship on these interdisciplinary initiatives in critical heritage studies. CHArt will support faculty and student research engaging local solutions and global discourses, methods, and practices focused on tangible and intangible heritages. CHArt will expand the roles of the visual and performing arts, museums, archeological sites, and other fields by diversifying approaches and practices of engaging with the past and with places as well as promoting the stories and sites that foreground the heritage of communities underrepresented or underserved in heritage professions, practices, and conversations. Through these efforts, the CHArt will

highlight the role of design and the visual and performing arts in creating connections between people, places, and pasts. Our initial objectives are to build a team of collaborators across campus, support student and faculty research through assistantships and pilot grants, convene conversations to share work in progress and build partnerships, and develop grant proposals to expand the work.

THE CENTER FOR EDUCATION MEASUREMENT AND EVALUATION (CEME)

Principal Investigator:

- Richard Lambert, Ph.D. (PI), Professor, Educational Leadership (rglamber@charlotte.edu)
- <https://ceme.charlotte.edu/>

Since 2008, *Center for Educational Measurement and Evaluation (CEME)* has generated substantial external funding (\$23,874,093), collaborated on externally funded projects, and established successful partnerships with many educational agencies. Currently, CEME provides program and performance evaluation, and educational research and measurement services, to various community partners. CEME seeks to extend its mission by providing social science research methodology support to researchers within the College of Education and collaborators across campus. This funding will support CEME as it seeks to connect with existing and emerging areas of excellence at UNC Charlotte. Specifically, we anticipate these efforts will position CEME as a source of high-quality research methods and evaluation content for grant proposals originating from content experts across campus. This work aims to foster collaboration between CEME and other university researchers, facilitate additional external funding, and support CEME collaborations with community agencies. The investment will support CEME to pursue the following goals: 1) extend existing collaborations, 2) develop new grant proposals, 3) expand UNC Charlotte's overall research support infrastructure, and 4) focus on the use of large datasets.

CENTER FOR ENVIRONMENTAL MONITORING AND INFORMATICS TECHNOLOGIES FOR PUBLIC HEALTH (CENMOIT)

Principal Investigator:

- Xiuxia Du, Professor, Department of Bioinformatics and Genomics, College of Computing and Informatics (Xiuxia.Du@charlotte.edu)

Senior Personnel:

College of Computing and Informatics

- Department of Bioinformatics and Genomics: Liz Cooper, Assistant Professor; Cynthia Gibas, Professor; Jessica Schlueter, Associate Professor; Jun Wang, Research Professor; Laurel Yohe, Assistant Professor, Department of Computer Science; Ahmed Helmy, Professor; Jing Yang, Professor

College of Engineering

- Department of Civil and Environmental Engineering: James Amburgey, Associate Professor; Mariya Munir, Assistant Professor; Mei Sun, Assistant Professor; Olya Keen, Associate Professor;
- Department of Electrical and Computer Engineering: Babak Parkhideh, Associate Professor
- Department of Mechanical Engineering and Engineering Science: Terry Xu, Professor

College of Humanities & Earth and Social Sciences

- Department of Geography & Earth Sciences: Eric Delmelle, Associate Professor

College of Science

- Department of Chemistry: Jordan Poler, Professor

University of Arkansas for Medical Sciences: Colin Kay, Professor & Director, Metabolomics & Analytical Chemistry Center Director, Precision Health Research, Arkansas Children's Research Institute; Aline Andres, Professor & Associate Director, Arkansas Children's Nutrition Center

The Pollution Detectives, LLC: Francis Koster, Ph.D.

External Advisors: Carol Spalding, President, Rowan Cabarrus Community College

Website: cenmoit.charlotte.edu (unpublished yet)

More than a century of intensive production and wide-spread utilization of chemicals have left millions of tons of these substances in our environment. A substantial portion of these have been causing various problems to our environment and ultimately to the health of microbes, plants, animals, and humans that live in it. Exposures to toxic substances, such as heavy metals, pesticides, and PFAS, are a major public health concern globally due to linkages to a wide range of health problems, including cancers, reproductive disorders, and neurological diseases. Despite significant progress, critical gaps still exist in terms of our understanding of the environment and how much exposure to these toxic chemicals affect human health. The Center aims to: 1) develop new sensing technologies for large-scale and affordable environmental and biological monitoring, 2) acquire such data, 3) build data analytics methodologies and informatics resources for studying the environment and its impact on human health, and 4) develop remediation technologies to reduce harmful chemicals in water, soil, and food. Toward this end, the pilot Center will bring together both well-established and new researchers in engineering, science, and informatics and carry out R&D in these areas. In the course of these R&D activities, the pilot Center will train students, postdocs, and faculty in the area of the environment and human health and build up the scientific, technological, and human capacity of UNC Charlotte to broaden and deepen its research portfolio in this area. In the meantime, the pilot Center will actively engage with local, state, and national stakeholders and increase the public's awareness of the critical importance of safeguarding our environment for human health.

CENTER FOR INNOVATION, TRANSLATIONAL RESEARCH AND APPLICATIONS OF NANOSTRUCTURED SYSTEMS (CITRANS)

Principal Investigator:

- Juan Vivero-Escoto, Department of Chemistry, College of Science (jviveroe@charlotte.edu)

Senior Personnel:

- Kirill Afonin, Chemistry, College of Science
- Christopher Bejger, Chemistry, College of Science
- Shunji Egusa, Physics and Optical Science, College of Science
- Brittany Johnson, Biological Sciences, College of Science
- Ian Marriot, Biological Sciences, College of Science
- Mariya Munir, Civil and Environmental Engineering, College of Engineering
- Jordan Poler, Chemistry, College of Science
- Rosario Porras-Aguilar, Physics and Optical Science, College of Science
- Thomas Schmedake, Chemistry, College of Science
- Jerry Troutman, Chemistry, College of Science
- Michael Walter, Chemistry, College of Science
- Yong Zhang, Electrical Engineering and Computer Science, College of Engineering

The Center for Innovation, Translational Research and Applications of Nanostructured Systems (CITRANS) brings together experts in the areas of chemistry, biology, physics, environmental science and engineering, bioengineering, mechanical engineering, optics and materials whose research merges at the nanoscale science. The research in CITRANS deals with three main focused areas: 1) biomedicine, 2) environmental science, and 3) materials. Research in these fields involves the development of nanoscale-based solutions

for major health, energy and environmental issues impacting our society. The main objectives of CITRANS are: 1) To promote the collaboration between its members to find innovative solutions to relevant problems in health, energy, environment and materials; 2) To support and direct the efforts of the teams associated with each focused area to compete for large-scale grants appropriate to their own scientific fields; and 3) To provide a collaborative environment for graduate and undergraduate students to pursue relevant research in nanoscale science.

THE CENTER FOR LEADERSHIP SCIENCE

Principal Investigators:

- George Banks, Department of Management, Belk College of Business (gbanks3@charlotte.edu)
- Janaki Gooty, Department of Management, Belk College of Business (jgooty@charlotte.edu)

Senior Personnel:

- Wenwen Dou, Department of Computer Science, College of Computing and Informatics
- Eric Heggstad, Department of Psychological Science, College of Humanities & Earth and Social Sciences
- Steven Rogelberg - dual appointment: Department of Psychological Science, College of Humanities & Earth and Social Sciences & Department of Management, Belk College of Business
- Nicole Strah, Department of Management, Belk College of Business
- Scott Tonidandel, Department of Management, Belk College of Business
- Jill Yavorsky, Department of Sociology, College of Humanities & Earth and Social Sciences

The Center for Leadership Science (CLS) takes an interdisciplinary approach to researching and teaching leadership, and addresses the barriers and challenges that emerging leaders face in rising to leadership positions. Our strategic priority is to fundamentally redefine leadership and, in turn, its application across countless leader development and training programs in business and society. CLS houses and disseminates leadership research, teaching and impact to the Charlotte community via undergraduate, graduate and UNC Charlotte community outreach.

CLS leverages open, robust and replicable science to:

- Redefine societal meanings of leadership in an inclusive manner
- Train leader behaviors that are effective regardless of background
- Improve systems within organizations to aid all stakeholders.

CENTER FOR MIGRATION AND DIASPORA STUDIES

Principal Investigator:

- David Dalton, Associate Professor, Languages and Culture Studies; Director, Latin American Studies (ddalto14@charlotte.edu)

Senior Personnel:

- Jurgen Buchenau, Professor, Department of History; Director, Capitalism Studies
- Lan Kolano, Professor and Chair, Middle, Secondary, and K-12 Education
- Beth Whitaker, Professor, Department of Political Science and Public Administration; Executive Director, Office of Interdisciplinary Studies
- Heather Smith, Faculty Director, Levine Scholars Program
- Chris Cameron, Professor, Department of History

The pilot Center for Migration and Diaspora Studies (CMDS) highlights research and fosters collaboration in three key areas: 1) Global Migration Studies (migration to/from/within Asia, Europe, Africa, the Americas, etc.); 2) Africana Studies; 3) Latin(x) American Studies. Beyond providing structured support and programming for students and scholars from various disciplines, departments, and colleges across campus, the Center also engages in community outreach by building and cultivating research-focused relationships with an array of local organizations (e.g. Latin American Coalition; Southeast Asian Coalition; Camino; etc.). The Center will foment a culture of research in migration and diaspora studies by bringing to campus distinguished speakers to give lectures and workshops on migration, Africana Studies, and Latin(x) American Studies as well as uplifting, and helping to further develop the work of UNC Charlotte, community, and regional scholars producing new knowledge and innovative practice in these areas. Interdisciplinary to the core, the Center will have a strong stake in the humanities, supporting faculty and student research in Africana, Latin(x) American, and North Atlantic studies in the areas of the arts, history, literature, and philosophy. At the same time, the Center will also support research in the social and spatial sciences, education, health and human services, and arts and architecture. A great strength of the Center will be its ability to bring together—and facilitate collaboration among—intellectuals from so many disciplines who share an interest in migration and diaspora studies.

CENTER FOR TAIMING AI

Principal Investigator:

- Taufiqar Khan, Professor and Chair, Department of Mathematics and Statistics, College of Science (taufiqar.khan@charlotte.edu)

Senior Personnel:

UNC Charlotte Team:

- Doug Hague, Executive Director, School of Data Science
- Jiancheng Jiang, Professor, Department of Mathematics and Statistics, College of Science
- Jake Lee, Assistant Professor, Department of Computer Science, College of Computing and Informatics
- Damien Williams, Assistant Professor, Department of Philosophy, School of Data Science, College of Humanities & Earth and Social Sciences

Business, Industry and Government Partners:

- Agus Sudjianto, Head of Corporate Model Risk, Executive Vice President, Wells Fargo Bank
- Alex Shenkar, Senior Vice President of Model Risk Management, Truist Bank
- Patrick Hall, Principal Scientist, Bnh.ai
- Gunay Dogan, Staff, Mathematical Software Group, NIST

Institutional Partners:

- Cole Smith, Dean of Engineering, Syracuse University
- Peter Maass, Professor and Director, Center for Industrial Mathematics, University of Bremen
- Michael Pokojovy, Assistant Professor, University of Texas at El Paso

The pilot Center for TAIMing AI aims to develop the methods to understand the limits and weaknesses of Machine Learning (ML) and Artificial Intelligence (AI) algorithms such that their adoption and use better our society. This emerging research area is grounded in the Charlotte area banks' strength in model risk management (MRM). The Center will focus on three main themes of Trustworthy AI through MRM (TAIM), mainly 1) extending the uncertainty quantification framework to establish clear demarcations for when an algorithm functions reliably and when it encounters limitations; 2) establish a hierarchical control framework that accounts for and ensures robust, resilient, and reliable implementation of algorithms; and 3) formulate a comprehensive framework managing the use of algorithms within our society that is based on 1) and 2).

The overarching goal of the center is to be an international research hub in the emerging area of identification and management of risks associated with the adoption of algorithms. Entities adopting algorithms and predictive models have often driven decisions without understanding the underlying risk and uncertainty to customers and our society. Thus, there is a pressing need to develop the rigorous scientific framework to ensure algorithms are trusted given the natural uncertainty and biases in models. This nascent subfield requires interactions of several research communities including machine learning, data science, applied mathematics, statistics, computer science, humanities, social sciences, risk management, ethics, defense, and health. Being grounded through partnerships with the Charlotte banking sector brings a knowledge base of managing the risk of adopting algorithms in practice as these banks have rapidly developed and adopted MRM practices over the last 15 years (post the 2008 Great Recession and regulatory oversight through the Federal Reserve's SR 11-7).

The center will deepen the intellectual foundations of TAIM methods, open tools, and processes. The center will focus on creating new knowledge, algorithms, open software, and risk and regulatory frameworks in this emerging field of research through partnerships with academia, industry, government (as demonstrated through our team and letters of support), and community stakeholders. The center will offer workshops, short courses, industry internships, researchers in residence, as well as faculty sabbaticals in industry. One of the goals of this center is to extend the intellectual foundation of these practices across a broader set of modeling techniques and practices where entities are adopting algorithms. This center will be the intellectual center for not only leading-edge techniques, but also sound adoption practices for industry and governmental entities.

CENTER FOR SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (CSTEM)

Principal Investigator:

- David Pugalee, Middle Secondary and K-12 Education, Cato College of Education
(David.Pugalee@charlotte.edu)

Senior Personnel:

- Alisa Wickliff, CSTEM
- Victor Mack, Pre-College Director

Affiliate Faculty:

- Daniel Alston, Rich Lambert, Michelle Stephan, Cato College of Education
- Mohsen Dorodchi, Cori Faklaris, Mary Lou Maher, Syeda Fatema Mazumder, Marlon Mejias, Harini Ramaprasad, Audrey Rorrer, Erik Saule, Michelle Stephan, Kalpathi Subramanian, Weichao Wang, David Wilson, College of Computing and Informatics
- Cathy Blat, Harish Cherukuri, Abasifreke Ebong, Brett Tempest, Mesbah Uddin, Dave Weggel, Terry Xu, William States Lee College of Engineering
- Kathryn Asala, Tonya Bates, Markus Etzkorn, Donald Jacobs, Kevin McGoff, Jordan Polar, Adam Reitzel, Thomas A. Schmedake, College of Science
- Gordon Hull, Greg Wickliff, Damien Williams, College of Humanities & Earth and Social Science
- Dongsong Zhang, Belk College of Business
- Doug Hague, Marco Scipioni, School of Data Science
- Liz McCormick, David Thaddeus, Isha Abdullah, College of Arts + Architecture
- Jordan Register, Center for Teaching and Learning

CSTEM develops and fosters collaborations with STEM faculty and staff across the University to promote STEM teaching, learning, and research with a high priority on identifying mechanisms contributing to sponsored programming. This work is guided by the following goals across PK-20: 1) promote collaborations addressing STEM education priorities; 2) develop and implement initiatives that extend UNC Charlotte's

STEM education programs; 3) develop new grant and external funding proposals; and 4) strengthen CSTEM emphasis on research and partnerships of Center programs. The Center's collaborations have led to multiple grant-funded projects and promoted research and scholarship in STEM education. CSTEM's program and planned activities connect with multiple Research Areas of Focus and Distinction including cybersecurity, socioeconomic mobility, educational measurement and evaluation, special and exceptional children, artificial intelligence, and nanoscience science and materials. CSTEM collaborations reflect the interdisciplinary nature of our work.

VIOLENCE PREVENTION CENTER

Principal Investigator:

- Apryl A. Alexander, Department of Public Health Sciences, College of Health and Human Services (Apryl.Alexander@charlotte.edu)

Senior Personnel:

- Robert Cramer, Department of Public Health Sciences, College of Health and Human Services
- Annelise Mennicke, School of Social Work, College of Health and Human Services

Center Faculty:

- Jessamyn Bowling, Department of Public Health Sciences, College of Health and Human Services
- Sam Cacace, Department of Public Health Sciences, College of Health and Human Services
- Janne Gaub, Criminal Justice and Criminology, College of Humanities & Earth and Social Sciences
- Rachel Jackson-Gordon, UNC Charlotte Urban Institute, urbanCORE
- Erika Montanaro, Department of Psychological Sciences, College of Humanities & Earth and Social Sciences
- Sonyia Richardson, School of Social Work, College of Health and Human Services
- Meagan Zarwell, Department of Public Health Sciences, College of Health and Human Services

External Consultants:

- Sarah McMahon, Center for Research on Ending Violence, Rutgers University
- Jeff Temple, Center for Violence Prevention, University of Texas Medical Branch

Website: <https://violenceprevention.charlotte.edu>

Leveraging a strong foundation of existing faculty and community partners, the UNC Charlotte Violence Prevention Center (VPC) is a collaboration between the College of Health and Human Services (CHHS), College of Humanities & Earth and Social Sciences (CHESS), and Urban Institute. The Center collaborates with academic, public, and governmental partners to research and implement empirically-informed prevention and intervention programs. The UNC Charlotte VPC's mission is multi-dimensional. The Center serves as a resource for transformative research, training, and technical assistance for communities, policymakers, and the public. The VPC will also support researchers, students and trainees, advocates, practitioners, and policymakers in violence prevention efforts locally and nationally. Integrating public health, social work, psychology, criminal justice, and urban health expertise, the proposed pilot research center approaches violence prevention from a multidisciplinary social-ecological perspective. Existing team members leverage knowledge and skills related to multiple violence types (e.g., intimate partner violence, sexual assault, gun violence, suicide); vulnerable populations (e.g., Black youth, sexual and gender minority, military, couples); and methodologies (e.g., qualitative, quantitative, social media, dyadic). Building on the UNC Charlotte area of emerging impact in urban health, VPC will focus on activities central to enhancing multidisciplinary grant competitiveness: 1) conduct workshops and engage stakeholders to create a hub for enhancing research collaborations, promoting team building, and linking UNC Charlotte scholars from various disciplines and community organizations, 2) promote research activities within the UNC Charlotte VPC to enhance skills, competitiveness for external funding, and increase translation of research, and 3) secure large-scale external funding for the UNC Charlotte VPC.

UNC SYSTEM CENTERS & INSTITUTES AT UNC CHARLOTTE

CHARLOTTE AVIATION INNOVATION AND RESEARCH INSTITUTE (CHARLOTTE AIR INSTITUTE)

Principal Investigators:

Srinivas S. Pulugurtha, Professor & Research Director, Department of Civil & Environmental Engineering (sspulugurtha@charlotte.edu)

Tara L. Cavalline, Professor, Department of Engineering Technology & Construction Management (TCavalline@charlotte.edu)

Website: air.charlotte.edu

Names, Departments, and Institutional Affiliations:

Internal Collaborators

- Brett Tempest, Department of Civil & Environmental Engineering
- Don Chen, Department of Engineering Technology & Construction Management
- Jake Smithwick, Department of Engineering Technology & Construction Management
- Jean-Claude Thill, Department of Geography and Earth Sciences
- Lei Zhu, Department of Industrial & Systems Engineering
- Omid Shoghli, Department of Engineering Technology & Construction Management
- Srinivas Akella, Department of Computer Science
- Suzanne Leland, Department of Political Science
- Vincent Ogunro, Department of Civil & Environmental Engineering
- Yuting Chen, Department of Engineering Technology & Construction Management

External Collaborators

- American Concrete Pavement Association (ACPA)
- Charlotte Douglas International Airport (CLT)
- Embry-Riddle Aeronautical University (ERAU)
- Federal Aviation Administration (FAA)
- National Renewable Energy Laboratory (NREL)
- Sullenberger Aviation Museum (SAM)
- Talbert, Bright & Ellington (TBE)
- University of Louisville

The Charlotte AIR Institute brings internal and external collaborators together to 1) proactively identify and collaborate on a focused-set of transformative research, education, and outreach initiatives with the aviation sector; and, 2) position stakeholders to address workforce development and economic & social mobility. It serves as an interdisciplinary platform for collaboration between engineers, construction/facility managers, social scientists, data scientists and others. The short-term goals of the Charlotte AIR Institute are to: 1) offer courses, webinars, and an annual conference; 2) build interdisciplinary teams aligned with national priorities for large-scale funding; and, 3) have a measurable impact on the aviation sector. The long-term goals are 1) to build a “living laboratory” at CLT to provide a conduit between STEM research opportunities and Charlotte’s workforce; and, 2) to achieve national and international recognition for expertise in aviation infrastructure, technology innovation, and data analytics by 2030.

CENTER FOR COMPUTATIONAL INTELLIGENCE TO PREDICT HEALTH AND ENVIRONMENTAL RISKS (CIPHER)

Principal Investigator:

- Daniel Janies, Carol Grotnes Belk Distinguished Professor of Bioinformatics and Genomics, College of Computing and Informatics, Co-Director of the CIPHER Center (djanies@charlotte.edu)

Senior Personnel:

- Adam Reitzel, Ph.D. Professor, Biological Sciences, College of Science, Co-Director of the CIPHER Center
- Ian Binns, Reading and Elementary Education, Cato College of Education
- Shi Chen, Public Health Sciences, College of Health and Human Services
- Wenwen Dou, Computer Science, College of Computing and Informatics
- Colby Ford, Founder Tuple, LLC
- Mark Heise, School of Medicine, UNC Chapel Hill
- Denis Jacob Machado, Bioinformatics and Genomics, College of Computing and Informatics
- Elaine Luo, Biological Sciences, College of Science
- Kevin McGoff, Mathematics and Statistics, College of Science
- Kathie Seley-Radtke, Chemistry & Biochemistry, University of Maryland, Baltimore County (UMBC)
- Jessica Schlueter, Bioinformatics and Genomics, College of Computing and Informatics
- Way Sung, Bioinformatics and Genomics, College of Computing and Informatics
- Rick White, Bioinformatics and Genomics, College of Computing and Informatics
- Damien Williams, Philosophy, College of Humanities & Earth and Social Sciences
- Rafael Felipe Da Costa Vieira, Public Health Sciences, College of Health and Human Services

Website: <https://cipher.charlotte.edu/>

The Center for Computational Intelligence to Predict Health and Environmental Risks (CIPHER), focuses on genomics and computing technologies as applied to health, microbiology, biological and human diversity. We have domestic and international partners for joint research and training in academia, medicine, industry, and government. Our projects focus on infectious diseases including emergent viruses and durable problems such as malaria, the global spread of antibiotic resistance, food safety, and failing ecosystem health. We apply computing and empirical technologies synergistically.

CIPHER is a university-wide center with constituents from the College of Computing and Informatics, College of Science, College of Humanities & Earth and Social Sciences, College of Engineering, College of Health and Human Services, and the College of Education. Our goals are to coalesce expertise in computer science, bioinformatics, software and information systems, biological sciences, math, geography, public health, data science, education, and communications. We are always open to new collaborations within and extramural to the University.

CENTER FOR APPLIED GEOGRAPHIC INFORMATION SCIENCE (CAGIS)--GEOSAN: GEOSPATIAL SENSING AND ANALYTICS

Principal Investigator:

- Wenwu Tang, Executive Director, Center for Applied Geographic Information Science (wenwutang@charlotte.edu)

Affiliated Personnel:

- Cynthia Gibas; Anthony Fodor; Jessica Schlueter; Srinivas Akella; Jing Yang; Aidong Lu, College of Computing and Informatics
- Akinwumi Ogundiran, Shannon Reid, Michael Turner, Matthew Eastin; Patricia Fall; Bill Graves; Missy Eppes; Michael Ewers; Doug Shoemaker; Isabelle Nilsson; Scott Hippensteel; Katherine

Idziorek; Sandra Clinton; Sara Gagne; Eric Delmelle; Casey Davenport; Craig Allan; Colleen Hammelman; Jean-Claude Thill; Fushcia-Ann Hoover; Jack Scheff, College of Humanities & Earth and Social Sciences

- Mariya Munir, Andrew Willis, Artur Wolek, Yuting Chen, Stephanie Pilkington, Jy Wu, Lei Zhu, Don Chen, Shen-En Chen, William States Lee College of Engineering
- Dongsong Zhang, Belk College of Business

Website: <https://gis.charlotte.edu>

The **research mission** of CAGIS is to address pressing multi-scale urban and environmental issues through cutting-edge spatiotemporal analytics and innovation. CAGIS places its research focus on resolving complex spatiotemporal questions in alternative knowledge domains, represented by urban change, environmental studies, health, climate and disaster, and smart and connected infrastructure. This is achieved by a synergistic and transformative integration of space-time principles, models, data, and computation driven by cyberinfrastructure and artificial intelligence technologies.

The **outreach mission** of CAGIS is to foster and facilitate the application of geospatial data and analytical solutions to serve the needs of faculty and students across the University, and external stakeholders from local to national levels. CAGIS is committed to providing geospatial analytical solutions and services to a diverse student body, scholars, and communities.

Our **vision** to GeoSAN as the Ignite Center is that GeoSAN will push CAGIS to become the national and international leader in geospatial sensing technologies and geospatial data science. GeoSAN will be a transformative geospatial catalyst and accelerator for project conceptualization and proposal development for large-scale external proposal initiatives by concentrating on the following main geospatial application domains: urban change, environmental quality and monitoring, health and well-being, climate and impacts, and smart and connected infrastructure.

URBAN INSTITUTE

Contact: Lori Thomas, PhD, Executive Director (lorithomas@charlotte.edu)

Senior Personnel:

- Asha Ellison, Director of Research Translation and Engagement
- Sydney Idzikowski, Associate Director of the Charlotte Regional Data Trust
- Kailas Venkitasubramanian, PhD, Director of Research Analytics
- Khou Xiong, Director of Community Research Services
- Vacant, Director of Policy Research (title tentative)

Website: ui.charlotte.edu

The UNC Charlotte Urban Institute (Institute) is an applied research and community outreach center of UNC Charlotte. We seek solutions to the complex social, economic, and environmental challenges facing the communities in the Charlotte region. We engage expertise across a diverse set of disciplines and life experiences to curate data and conduct actionable research and policy analysis that helps *equip change agents with the information and tools they need to drive equitable and sustainable outcomes for our Charlotte region*.

The **Charlotte Regional Data Trust (Data Trust)** is a community-university partnership that links administrative data across service and organizational silos in order to provide information our community can act on. The Data Trust, formerly named the Institute for Social Capital, includes over 50 signed data sharing partnerships, and is a 501(c)(3) governed by a board of community stakeholders and staffed by the

Charlotte Urban Institute. The Board guides the strategic research and engagement priorities of the Institute.

The issues we address and the problems we tackle are purposefully broad and have been so since our establishment in 1969. We address challenges that vary over time and across a large metropolitan region, encompassing the urban center of Charlotte and 14 surrounding counties in North (11 counties) and South Carolina (3 counties). We work to equip change agents in this greater Charlotte region through four primary areas of work:

1. **The Charlotte Regional Data Trust (Data Trust) and Community Data Services** - In addition to our integrated administrative data system, we provide a range of data services that include a partnership with the City of Charlotte and Mecklenburg County to support the Charlotte-Mecklenburg Quality of Life Explorer and the development of a Regional Explorer.
2. **Community Research Services** - We provide research and evaluation services in response to requests from area non-profit, corporate, and government organizations. Services include planning for and conducting formative and summative program evaluations, asset and needs assessments, ecosystem analyses, and other services as requested by organizations in our area. Current projects include an evaluation of a public health violence intervention, the evaluation of an established nonprofit housing organization, and the documentation of news and information resources for a rapidly gentrifying area.
3. **Policy and Issue Analysis** - We examine pressing policy issues in our region through data, research, and partnerships. Current projects include housing assessments for Mecklenburg towns and participation in the National Zoning Atlas and the development of a regional zoning tool to serve regional stakeholders.
4. **Research Outreach, Translation, and Engagement** - We are committed to relational research and engaging our communities in all stages of our research and data efforts. Beyond ensuring that our research is understandable to a broad and general audience, we also work to engage communities early in the research process, incorporating stakeholder wisdom and lived experience into the questions we ask and the interpretation of findings. Engagement opportunities range from a general newsletter and think-tank journalism to neighborhood data walks to advisory and review committees convened for specific projects.

We provide three main benefits to our community: 1) actionable information, 2) actionable tools, and 3) opportunities to participate in and shape the research that informs our community.

CENTER FOR OPTOELECTRONICS AND OPTICAL COMMUNICATIONS “OPTO CENTER”

Contact: Glenn Boreman, Director of the Opto Center and Professor & Chair, Physics and Optical Science, College of Science (gboreman@charlotte.edu)

Assistant Director: Scott Williams

Key Personnel: Lou Deguzman, PhD, Daniel Furr, Business Service Officer (TBD)

Website: <https://opticscenter.charlotte.edu/>

The Opto Center provides cost-effective access to specialized expertise and apparatus in optics, imaging, and micro & nano-fabrication, including: plasma-enhanced etching, dielectric deposition and metallization; optical & e-beam lithography; optical, e-beam, & atomic-force microscopy; x-ray diffraction; 3-D nano-scale printing; image-quality characterization; interferometric surface characterization; spectroscopic measurements (VUV to FIR, continuous) of refractive index and measurement of IR spectral emissivity,

measurement of BRDF/BTDF; optical design services; fiber optics; and laser technical support. Our highly qualified support staff can perform measurements and fabrications, design and develop prototypes, or provide training to users to operate our facilities independently. We welcome teaming opportunities with academic, industry, and government partners, and often participate in SBIR/STTR projects with industry.

The mission of the Opto Center is to provide infrastructure for students, faculty, and industrial partners who share research interests in optoelectronics and optical communications, and to promote awareness of the importance of optical technology. Furthermore, the Center for Optoelectronics and Optical Communications aims to:

Educate and train, through existing UNC Charlotte academic units, the new generation of scientists and engineers required to support the need for highly trained professionals in optics fields. Involve students in the process of inquiry that leads to senior theses, graduate dissertations, and peer-reviewed publications. Conduct pure and applied research in optical science and technology. Foster technology transfer between the University, other research centers, and the industrial community. Support the academic program in Optical Science and Engineering at Charlotte. Encourage interaction and cooperation among the faculty, student, and professional participants. Organize meetings, conferences, and symposia for the benefit of the optics community. Create and maintain communication channels for the dissemination of information about optoelectronics, optical communications, and the optics community.

The Opto Center and faculty are part of two exciting NSF-sponsored I/UCRC (Industry/University Collaborative Research Center) consortia, illustrating the expertise on our campus.

Center for Freeform Optics (CeFO)

Director, Jannick Rolland (rolland@optics.rochester.edu)

Brian J. Thompson Professor of Optical Engineering
University of Rochester

Charlotte Site Director, Thomas Suleski (tsuleski@charlotte.edu)

Professor of Physics and Optical Science
College of Science

Charlotte Assistant Site Director

Kosta Falaggi (kfalaggi@uncc.edu)
Associate Professor of Mechanical Engineering

Website: <https://centerfreeformoptics.org/>

Center for Freeform Optics is an NSF-sponsored Industry/University Collaborative Research Center (I/UCRC). Charlotte partners with the University of Rochester (lead institution), in development of the technology of freeform optics - optical systems enabled by advances in precision machining technology that are not under the usual constraint of rotation symmetry about an axis, and in the training of graduate students in this area. The additional degrees of freedom gained by the employment of essentially arbitrary 3D surfaces allow significant reduction of size and weight along with improved image quality and throughput. Activities include design, fabrication, testing, as well as development of pre-competitive IP, shared among industry members of the Center.

Current Industry Members

AFRL, ASML, Ball Aerospace, Meta, LightPath, Lockheed-Martin, MorphOptic, Nikon, Optimax, OptiPro, Opto Alignment, Samsung, Synopsys, Thales, Vision Products, and Zeiss

Center for Metamaterial (CfM)

Director, Ishwar Aggarwal Ishwar.Aggarwal@charlotte.edu
Research Professor, Physics and Optical Science

Assistant Director, Tino Hofmann tino.hofmann@charlotte.edu
Associate Professor, Physics and Optical Science

Website: <https://iucrc.nsf.gov/centers/center-for-metamaterials/>

The Center for Metamaterials (CfM) is an NSF-sponsored Industry/University Collaborative Research Center (I/UCRC) at Charlotte. The Center staff and faculty designs, fabricates, and tests a wide range of metamaterials. Our mission is to advance fundamental and applied metamaterials research, development, and technology transfer through strong collaborations between industry and universities. There is strong industry interest in metamaterials, as they are being used to develop new or higher-performing optical, electronic, and acoustic devices.

Metamaterials are patterned and/or composite materials that exhibit effective permittivity, permeability, or refractive index properties not found in nature. Their properties are commonly the result of resonant phenomena arising from the subwavelength-scaled elements forming those patterns or composites. The smaller these elements are with respect to the wavelength of the electromagnetic radiation, the better the metamaterial satisfies effective-medium criteria and the more accurately they can be treated as a genuinely new material. Such materials have the potential to provide index values - very large, less than unity, or negative - with broad applications.

Research Areas

- **Active metamaterials:** CfM explores this rich area of fundamental research of metamaterial, which is characteristically defined by its active composition of the host material. "Active" refers to the material properties that exhibit either optical gain under pumping, strong material nonlinear properties, or both.
- **Active metasurfaces:** Metamaterials researchers have developed novel metallic feature structures, metasurfaces, that allow for local control of the phase as an optical beam is transmitted through a surface. This project is investigating these metasurfaces using a low-cost, rapid-development approach to increase the efficiency of the refraction, develop designs that allow for pixelated arrays of flat lenses, and investigate tuning concepts that would allow for the steering of microwave and infrared beams.
- **Design and fabrication of low-loss low-index optical metamaterials:** A new and rigorous theory that goes well beyond well-known mixing rules has been used to predict specific particle properties that would lead to a composite metamaterial having a desired refractive index, such as less than unity. Modeling based on this method and the development of processes and procedures to make and characterize coated nanoparticles are in progress.
- **Infrared Mueller matrix imaging of dielectric metamaterials:** Recent advances in three-dimensional laser direct writing enable the fabrication of dielectric metamaterials composed of constituents with virtually arbitrary geometry at the nanometer scale. But analysis of such metamaterials in the infrared spectral range is still lacking. In this project, CfM uses variable angle of incidence ellipsometry and near normal incidence ellipsometry to characterize infrared metamaterials composed of subwavelength dielectric structures.
- **Metasurface design:** This project is developing and validating a design tool for bulk metamaterials that considers coupling effects between nanostructures. It is based on a building block of

resonators for each nanostructure referenced in a database to compile the desired design structure.

- **Terahertz (THz) metamaterials:** CfM has discovered that THz form-birefringence can be induced in subwavelength structures fabricated from methacrylates using stereolithographic fabrication. These results provide a new avenue for the fabrication of highly anisotropic THz metamaterials and their use for THz sensing and imaging applications.

CENTER FOR PRECISION METROLOGY (CPM) (GRADUATED)

Contact: Edward Morse, Norvin Kennedy Dickerson Jr Distinguished Professor, and Director of CPM (edward.morse@charlotte.edu)

Assistant Director: Jimmie Miller (jamiller@charlotte.edu)

Affiliated faculty:

Mechanical Engineering - Brigid Mullany, Stuart Smith, Kosta Falaggis, Jaime Berez, Steven Schmid, Harish Cherukuri, Matt Davies, Jose Outeiro, Mahmoud Dinar

Physics - Dr. Angela Allen, Dr. Tsing-hua Her, Dr. Tom Suleski, Rosario Porras Aguilar

Current Industrial Affiliate members: Boeing, Cummins, Raytheon, Intel, Timken, Corning, Zygo, John Deere, NIST, Trane, ATT Metrology.

Website: <https://cpm.charlotte.edu/>

The Center for Precision Metrology is an interdisciplinary association of UNC Charlotte faculty and student researchers, allied with industrial partners in the research, development and integration of precision metrology as applied to manufacturing. Working with dimensional tolerances on the order of 10 parts per million or better, precision metrology encompasses the methods of production and inspection in manufacturing, measurement, algorithms, tolerance representation, and the integration of metrology into factory quality systems.

The Center for Precision Metrology (CPM) is a "graduated" Industry/University Cooperative Research Center (I/UCRC), having been funded for two 5-year terms by the National Science Foundation and now self-supporting through research and membership in its industrial affiliates program. The CPM is charged with breaking new ground in precision metrology by addressing real-world industrial concerns. Through the associated Affiliates Program, industrial and Center researchers collaborate on projects that involve generic and specific manufacturing metrology problems. The Center maintains a world-class dimensional metrology laboratory and has over \$15 million in capital equipment supporting precision manufacturing and metrology. No other university in the Americas has the metrology infrastructure and expertise of the CPM.

In support of the Center's research efforts, affiliate membership dues are directly applied to student support for those projects voted on by the members. The CPM works closely with the UNC Charlotte William States Lee College of Engineering's internationally recognized Advanced Manufacturing program as well. Additional specific research is funded through contracts with industry, National Laboratories (NIST, LLNL, ORNL, etc.), and federal agencies (DOE, DOD) to address proprietary application and development projects. Government funding is solicited for sponsoring fundamental and large-scale metrology projects. For example, the Center partnered with lead university UCLA as an NSF Nanoscale Science and Engineering Center for Scalable and Integrated Nanomanufacturing (SINAM) along with the UC Berkeley, Stanford, UCSD, and HP labs.

CENTER FOR PROFESSIONAL AND APPLIED ETHICS

Contact:

- Gordon Hull, Director (ghull@charlotte.edu)

Website: ethics.charlotte.edu

As the Ethics Center for North Carolina's urban research university, The Center for Professional and Applied Ethics works to promote a culture of robust research and discussion in ethics and the application of ethical research and debate in the University, Charlotte community, and beyond.

The Center for Professional and Applied Ethics collaborates with a range of constituencies, providing ethics expertise and research as a foundation for ethical deliberation. Together we shape an interdisciplinary intellectual and moral space in which people can critically assess, thoughtfully discuss, and strategically address ethical challenges in areas such as business, healthcare, information technology and popular culture.

CHILDRESS KLEIN CENTER FOR REAL ESTATE

Contact:

- Yongqiang Chu, Director (ychu3@charlotte.edu)

Website: <https://realestate.charlotte.edu/>

The Childress Klein Center for Real Estate at UNC Charlotte was established to further the knowledge of real estate, public policy and urban economics in the professional community through its teaching, research and community outreach activities. It has been ranked among the 20 most active research institutions in real estate for the past decade.

The Center administers the M.S. in Real Estate program, the MBA concentration and certificate programs in real estate finance and development, and manages programming and outreach to the Real Estate Alumni Association and Real Estate Advisory Board.

THE RIBARSKY CENTER FOR VISUAL ANALYTICS

Contact:

- Wenwen Dou, Co-Director (wenwen.dou@charlotte.edu)
- Zachary Wartell, Co-Director (zwartell@charlotte.edu)

Website: <https://viscenter.charlotte.edu/>

Senior Personnel:

- K. R. Subramanian Associate Professor of Computer Science
- Jing Yang, Professor of Computer Science
- Aidong Lu, Professor of Computer Science
- William Tolone, Professor of Software and Information Systems, Associate Dean of Graduate Programs, CCI
- Wlodek Zadrozny, Professor of Computer Science
- Douglas Markant, Assistant Professor of Psychology
- Chris Beokrem, Associate Professor in the School of Architecture
- Heather Lipford, Professor of Software Information Systems

The Ribarsky Center for Visual Analytics is a highly interdisciplinary center that applies interactive visualization and visual analytics to a variety of large-scale and complex problems in science, engineering, medicine, business, design, and the arts. It was established in January 2005 and includes over 30 faculty members and over a hundred graduate and undergraduate students.

The faculty at The Ribarsky Center for Visual Analytics is truly interdisciplinary with members from CS, SIS, Engineering, English, Geography and Earth Sciences, Architecture, Ethics, and other departments. The Ribarsky Center for Visual Analytics also has one of the deepest programs anywhere in fundamental visualization, visual analytics, and human-computer interaction research with 9 faculty members doing work in these areas. The main Visual Analytics Lab provides an exciting, state-of-the-art environment for visualization and HCI research and application development with an abundance of advanced displays, interaction devices, and a large, multiscreen stereoscopic projection system. These unique facilities are available for use to all Center faculty and students. In addition, faculty and students enjoy a highly interactive and collaborative environment through the Center's seminar series, invited speakers, symposia, workshops, social events, and other activities.

THE NORTH CAROLINA BATTERY COMPLEXITY, AUTONOMOUS VEHICLE AND ELECTRIFICATION RESEARCH CENTER (BATT CAVE)

Contact:

- Dr. Tiefu Zhao, Interim Director, BATT CAVE, Associate Professor of Electrical and Computer Engineering (tiefu.zhao@charlotte.edu)

Website: <https://battcave.charlotte.edu/>

The North Carolina Battery Complexity, Autonomous Vehicle and Electrification Research Center, the BATT CAVE, is driving innovation by unraveling the intricate world of batteries and their applications that will drive the next generation of autonomous vehicles, electrification, smart cities, and intelligence systems.

CENTER FOR BIOMEDICAL ENGINEERING AND SCIENCE (CBES)

Contact: TBD

Website: <https://cbes.charlotte.edu/>

The complexity of biomedical issues requires collaborative and multidisciplinary efforts to make optimal advancements. The CBES mission addresses this by fostering interdisciplinary collaborations for advancing biomedical engineering research and development using a systems approach. As such CBES provides the infrastructure for faculty and students at UNC Charlotte and biomedical researchers in the Charlotte metropolitan area, to collaborate on critical biomedical issues. In this way our CBES researchers are able to synergize their expertise to strongly impact biomedical engineering research, development, and practices.