Data-enabled Disaster Resilience Center at Wichita State University:
Creation of a Digital Platform Ecosystem for Great Plains Disaster Resilience

a. Participating Investigators.

College of Engineering
K.C., Dukka, **PI** and **Director**, Associate Professor and Director for Data Analytics - EE&CS, CoE
Rattani, Ajita, **Co-PI** Assistant Professor of Computer Science - EE&CS, CoE
Sinha, Kaushik, **Co-PI** *Associate Professor of Computer Science* - EE&CS, CoE
Bagai, Rajiv, **Co-PI** *Professor of Computer Science* - EE&CS, CoE
Dutta, Atri, **Co-PI** *Associate Professor of Aerospace Engineering* - Aerospace Engineering, CoE

Fairmount College of Liberal Arts & Sciences
Demissie, Zelalem, **Co-PI** *Assistant Professor of GeoSciences* - Geology Dept., LAS
Rimmington, Glyn, **Co-PI** and **Co-Director**, *Distinguished Professor of Global Learning* - Geology Dept., LAS
Billingham, Chase, **Co-PI** and **Co-Director** *Associate Professor of Sociology* - Sociology Dept., LAS
Figy, Terrance, **Co-PI** and **Co-Director***, Assistant Professor of Physics* - Mathematics, Statistics & Physics Dept., LAS

College of Applied Studies
Alagic, Mara, **Co-PI** and **Co-Director** *Professor* - School of Education, CAS

Barton School of Business
Rai, Atul, **Co-PI** and **Co-Director** *Larry Jones Faculty Fellow & Associate Professor of Accounting* - Accounting Dept., Barton School of Business

University Libraries
Filbert, Nathan, **Co-PI**, and **Co-Director** *Assistant Professor - Instruction & Research Services* - University Libraries
Kuhlmann, Meghann, **Co-PI** *Assistant Professor - Instruction and Research Services* - University Libraries
Bowen, Aaron, **Co-PI** *Assistant Professor - Instruction and Research Services* - University Libraries
Sclafani, Maria, **Co-PI** *Assistant Professor - Instruction and Research Services* - University Libraries
Lindsay, Ethan, **Co-PI** *Assistant Professor - Instruction and Research Services*, University Libraries
Matveyeva, Susan, **Co-PI** *Associate Professor & Catalog & Institutional Repository Librarian,* University Libraries

CVs are attached.

b. Theme.
Digital Transformation

c. Introduction, Relevance & Need

Problem: National Centers for Environmental Information (NCEI) calculates the cost of extreme weather events as over $1b with a total of $1.16t from 2005 to 2019. The Midwest is affected by tornadoes, hail storms, and flooding. Record flooding of the Missouri River in 2019 cost $10.8b in damage. Aside from financial costs, there are human costs—deaths and trauma suffered by whole communities. Climate change is expected to increase the frequency and intensity of such extreme events. The US government's Fourth National Climate Assessment estimated that the consequences of climate change could cut U.S. GDP by 10% by 2100. The recent Covid-19 pandemic disaster has dramatically affected our society. Human activity has become one of the dominant influences on the environment and climate. But, the impact of these disasters can be reduced if we can (a) *predict the occurrences* of disasters and (b) *assess the resilience* of the communities. Accurate prediction of disasters remains a challenge that is being overcome gradually with the digital transformation of sensor systems, databases, mapping using Unmanned Aerial Vehicles (UAVs) and nano-satellites, but much remains to be done[22,23,24,25,26]. Therefore, there exists a great need for the development of new tools for predicting the occurrences of disasters and assess the resiliency of the communities.

Relevance: There is no better time than now to work on one of the most important topics facing mankind: disaster management. A huge amount of multiple modes (or types) of data (image, text, social media, sensor data, institutional data, etc.) is now available and also the field of Artificial Intelligence has entered a new phase with the development of state-of-the-art Deep Learning technologies. Digital technologies present opportunities for us to provide better experiences for various stakeholders by building a digital platform that serves as both repository (just like youtube), and prediction. Equally important for disaster management is being able to assess the resilience or the capacity of communities to respond and recover sociologically, economically, and ecologically, when a disaster eventually strikes. To maximize resilience, we can learn from past disasters. This knowledge can be used to optimize socio-economic, ecological, and infrastructural characteristics of a given community. Essentially, we would like to take advantage of these opportunities through digital transformation and build a digital platform for disaster resiliency. We aim to effect technology transfer, learning, and preparation with the aid of an integrated, digital platform. It may be used to revise predictions, based on the latest information, to visualize the resilience of communities under various disaster scenarios and to conduct what-if simulations for evaluating policy and/or educational purposes (Fig. 1).

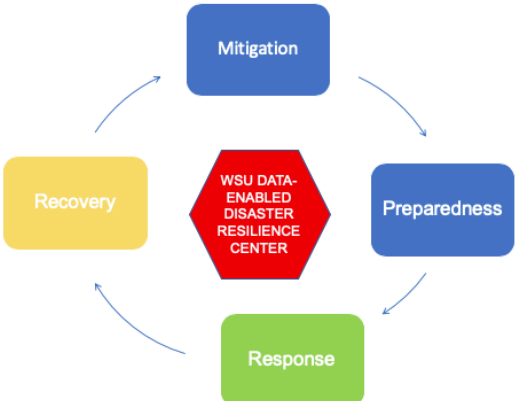


Figure 1 Long-term goal of the research cluster, the goals for the current project are shown in blue

Since the late 1990s, scholars have emphasized the benefits of digital transformation for economic growth and prosperity[9,13,14,15,21], including applications of big data, data analytics, the Internet of things, mobile computing, and cloud computing[4,11]. For all levels of government, this translates to new and improved services. For local government, digital transformation can deliver services that are more intuitive and make communities smarter. WSU is uniquely positioned to provide many innovations to Wichita, Kansas, and the world through a combination of convergent sciences and digital transformation.

The creation of freeware tools like *Google Maps* and *Earth*; Microsoft's *Virtual Earth* and *Bing Maps*; and NASA's *World Wind*, has allowed everyone with an Internet connection to explore the world with GIS[3,5,6,7,8,12,16,17,20]. According to *Internet World Statistics* (IWS), 2.2m people or 79% of Kansans used the Internet in June 2010 plus 1.7m, or 61.4% of Kansans used Facebook in March 2011. In 2015, 2.6b people worldwide owned smartphones[10], and with 5.0b requests weekly to *Apple Maps* representing a substantial market share for GIS Dashboard and GIS-based web applications[2].

This development of GIS provided research scientists with a new metaphor and a role for GIS as a communication medium[18,19]. GIS has now increasingly been recognized as media by software-tool developers, and vendors are indicated by the names they choose for their products: *GeoMedia*,

SpatialMedia, *Map TV*, or *MapTube*. Supported by a corps of volunteers[1], NavTeq's *Map Reporter* program offers further evidence of GIS being a communication medium, both metaphorically and literally.

Significance: At any given instance of time, any community is in *one of the four phases* of disaster management viz. mitigation, preparedness, response, recovery (Fig 1). The ultimate goal of the research cluster is to *create a digital platform for the Great Plains area that can help the region with all four phases by enabling to predict the various type of disasters as well as the potential impact of the disasters on the economic, social, ecosystem, human capital, and other aspects*. For this proposal, we propose to create *a test-bed digital platform for a small geographic region of the Wichita area that allows us to predict/analyze/simulate various what-if scenarios so that the community is more resilient to disaster focusing on Mitigation and Preparedness* (Fig.1). This requires a multi-pronged approach that deals with all the four phases of disaster management. Specifically, we will focus on the following: disaster mitigation (prediction of disaster and classification of disaster using multimodal data) and disaster resilience where we assess its components ranging from economic impact to human loss.

In the face of natural and manmade disasters, GIS can serve as a key communication and information sharing tool for national resource coordination and local first responders. In this project, we aim to develop improved predictive tools for the prediction of various disasters (as described in the Research cluster) and tools for a comprehensive assessment of community resilience for a range of disaster scenarios. For this pilot project, we will focus on disasters more relevant to Wichita area (hailstorms, tornadoes, landslides, and groundwater depletion and contamination). The tools will be developed using lessons and data from past disasters, here and worldwide, using AI, machine learning, and deep learning algorithms applied to georeferenced data for physical infrastructure and socio-economic, educational, and other quantities. Disasters that can provide *training* data may include earthquake sequences in Puerto Rico, California, and Utah, landslides in Oklahoma and around hydro-electric dams, and depletion and contamination of the Ogallala and other aquifers, upon which municipal water supplies and irrigated agriculture depend.

We envisage the end product to be a digital platform including a dashboard with an embedded GIS that can be used for the prediction of specific disasters and assessment of resilience aspects. It will be designed for use by policy analysts, disaster management, and as a tool for education at all levels. There will be tabs for each type of disaster and each aspect of resilience. In the initial version, there may be tabs for hurricanes, landslides, hail, and groundwater. For each of these, locations or regions can be displayed for all aspects of resilience. A user will be able to visualize the current situation in terms of an imminent disaster or terms of societal stratification, education level, economic productivity, quality of infrastructure, and conduct *what-if* analyses. Each time, the GIS map will be modified accordingly. First responders may use it to detect hazards due to poor infrastructure during rescue operations. Policy analysts may use it to visualize benefits of infrastructure upgrades, economic stimulus for small businesses, development of non-profit organizations, measures to attract new businesses or new educational facilities.

Relationship to Theme(s): The research and development activities of this cluster will involve extensive *digital transformation* as integration of various modes of data and application of various Artificial Intelligence tools and techniques with a focus on disaster prediction and assessing community resilience.

Need for convergence research cluster and Description of Research Cluster: *A*ny community is always in one of these four phases of disaster management *mitigation, preparedness, response, and recovery.* This is bigger than any one of the research disciplines. Hence, an integrated research cluster with faculty encompassing various areas is indispensable to tackle this problem. Hence, this project draws together faculty from Education, Business, GeoSciences, Sociology, Computer Science, Aerospace Engineering, High-Performance Computing, and the University Libraries. This research cluster has faculty with expertise in algorithms, AI, GIS, remote sensing, feature recognition, machine learning, deep learning, big data along with sociologists, economists, environmental scientists, geoscientists to produce an integrated dashboard for disaster prediction and resilience assessment. In addition, the cluster will collaborate with NetApp in the Innovation Campus and with faculty at Kansas State University with expertise in social media analytics. It will provide opportunities for junior faculty and graduate students to gain experience and expertise in interdisciplinary collaboration.

d. Research Cluster

As mentioned earlier, to tackle the overall 'Disaster management' process, we need a multi-pronged approach. Hence, the proposed research cluster, in its aspects of Disaster Resiliency, builds upon the existing strengths of the participating faculty from Geology/Environmental Science/GIS (Demissie, Rimmington), Data Engineering/Data Science and HPC Computing (Bagai, Sinha, Figy, K.C.), Sociology, Economics and Education (Billingham, Alagic, Rai), Satellite Image/Image Processing (Dutta, Rattani), and Library Sciences (Nathan, Aaron, Meghann, Susan, Ethan, Maria). More details about each member's research publications can be found in the attached CVs.

Figure 2. WSU Data-enabled Disaster Resilience Center

The schematic of the proposed Data-enabled Disaster Resilience Research Center (DDRC) or cluster is shown in Fig. 2. Essentially, the overall cluster is divided into three major thrusts: a) Prediction Thrust b) Resilience analysis Thrust and c) Creation of Digital Platform Ecosystem Thrust. In the long-term, the overarching goal of this research cluster is to develop overall Great Plains region for mitigating, preparing, responding and recovering from a disaster. As evident from the timeline and scope of this proposal, our objective is to develop a 'Digital Platform' for disaster resiliency focused on one local zip code (e.g., 67218). To achieve this objective of the project, the DDRC's thrusts have the following specific tasks and aims:

1) Prediction Thrust (KC, Rattani, Sinha, Bagai, Dutta, Rai, Rimmington, Demissie) will have 2 tasks:

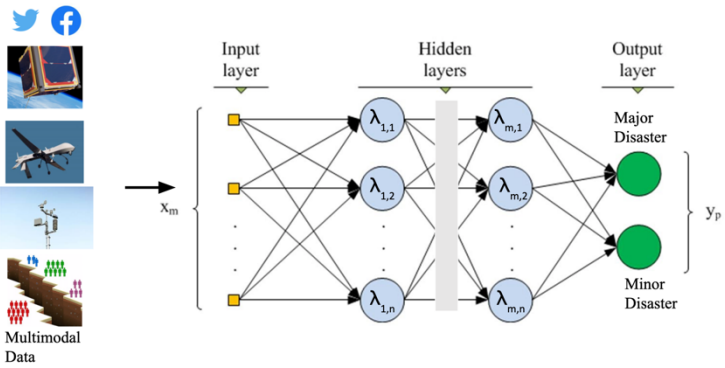


Figure 3 Prediction of disasters (classification) using Deep-learning

Task 1: Prediction of disaster(s) using multi-modal data A deep learning approach will be developed to predict disasters, using multi-modal data (social media, CubeSat imagery, sensor data, weather data, etc.) Fig. 3. Previous research publication of the PI's will be invaluable for this thrust.

Task 2. Prediction of individual components of resilience The prediction of disaster(s) approach will be expanded to predict the state of resilience components: sociological, economic, educational, geological, environmental, infrastructural.

2) Resilience Analysis Thrust (Alagic, Demissie, Rimmington, Rai, Billingham, Filbert et al.). The task of this thrust is to design and develop a Community Disaster Resilience (CDR) index comprising a composite function of component indexes listed in Thrust 1, Task 2, and illustrated in Fig. 4.

3) Digital Platform Thrust (all team members):

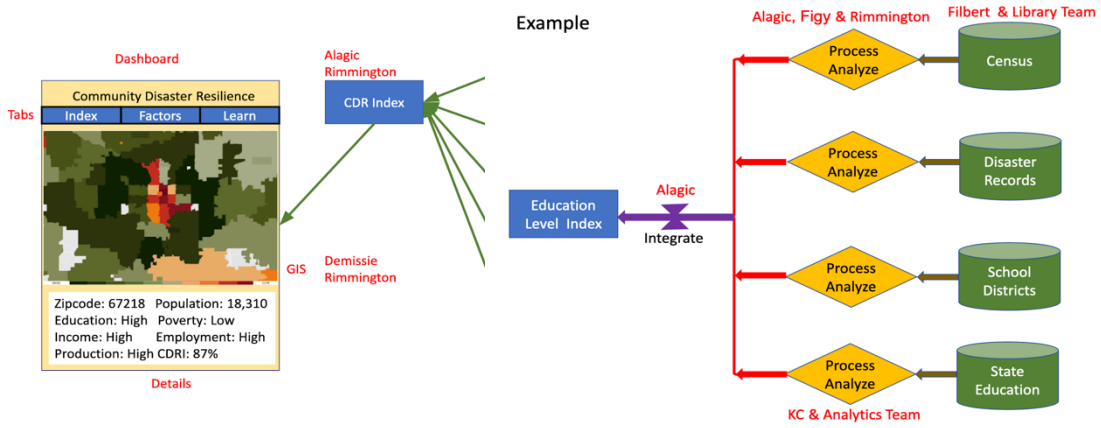


Figure 4 Resilience Assessment Thrust (left) Overall Community Disaster Resilience (CDR) index and (right) example for Education Level Index.

This thrust's task will be to design and implement the digital platform by incorporating both the disaster prediction capability of Thrust 1 and the resilience assessment capability of Thrust 2 for each community. KC has significant experience in developing web-servers (http://bcb.ncat.edu/softwares/) for the prediction tools while Demissie has significant experience in developing GIS-based dashboards. The digital platform will allow prediction, what-if scenarios, resilience assessment, and learning capability.

History of Previous Collaboration

The nature of this project is transdisciplinary as reflected in its long-term goal, requiring the collaboration of faculty from multiple disciplines as already described. Although it was not realistic to expect that they all worked collaboratively on one project, *there are several collaborative clusters from previous projects:* KC and Figy have worked on an NSF MRI project proposal to enhance current BioShock Cluster; Rattani, and KC have worked on a DoD proposal for test-bed of Biometric and Cybersecurity research; KC and Alagic have worked on an NSF NRT proposal project; and Rimmington and Alagic have worked together on multiple projects, including an NSF DERUT project with colleagues in Industrial Engineering. The participating faculty researchers have extensive collaborative experience both spanning multiple US institutions and internationally. Only a small subset of the collaborations are shown here.

KC has a strong network of US collaborators: two NSF projects with U. Michigan colleagues, two publications with Purdue colleagues, one with a KU colleague, and NSF submission with a K-State colleague, as well as publications with international collaborators. Recently, with other KBOR institutions and outside he submitted a $6M NSF EPSCOR grant as PI.

Mara Alagic's collaborative research experiences range from local to national and international, resulting in journal publications and conference presentations in various areas of Education (pedagogical content knowledge; epistemological beliefs), Integrated STEM Education (problem/project-based learning; mathematics and the arts), online learning (instructional design; discipline-related PCK; communication and engagement; accessibility), and Intercultural communication competence (structural and cognitive-linguistic models; third place learning).

Chase Billingham has collaborated on relevant research with colleagues in the Hugo Wall School of Public Affairs, dealing with local public policy solutions for remediation of groundwater pollution in Wichita and resulting in an opportunity for a graduate research assistant to participate in the research.

Glyn Rimmington has been collaborating in and leading several regional and global, multidisciplinary, environmental science projects concerned with: (a) climate change and variation among Pacific Rim nations (Australia, US, Canada, China, Japan, Thailand, Philippines, Mexico – NSF Pacific Rim Program: 1986-1995); (b) combating desertification in Western China and detection of subsurface hydrocarbon leaks in Yellow River delta oil fields, using hyperspectral sensors mounted on UAVs (Chinese Academy of

Sciences, Japan, UK, US, Australia: 1999-2013; 2013-2015); plus (c) global learning projects with many WSU and international faculty (Australia, Egypt, Germany, India, Japan, Nigeria, Ramallah, Russia, Swaziland, Turkey, and UK: 2001-2010). The outcomes of these projects include journal papers, chapters, and multiple books.

Opportunity for New Partnerships: This project broadens collaboration in the digital transformation research of multifaceted data from disciplines within the social and physical sciences, humanities, economics, data engineering and science, UAV and Satellite imaging, and the WSU libraries. This will inspire new partnerships among participating faculty who otherwise would not have that opportunity. As already described, each 'Thrust Area' brings in faculty from different domains. Also, we anticipate expanding these partnerships to include expertise in human-factors research and the communication arts.

Evidence of Externally Funded Research: PI's and Co-PI's involved in the project have quite a proven track record of external Funding. PI KC has already secured more than $3M in external funding agencies including NSF, NIH and DOD (e.g. KC (Multi-PI) (2018-2023) NIH 5R25GM119987, $1,356,813, KC (PI) (2019-2023) NSF IIS-2003019, $111,600, KC (Former PI) (2019-2022) NSF EIR-1901793, $489,021). Co-PI Dutta has secured more than $1M from various agencies (SRI, Kansas NASA EPSCOR Program (Dutta, PI), 2014-2015, Total: $119,484, 80NSSC19K1375, NASA FINESST Program (Dutta, PI), Total: $135,000, 2019-2022, $135,000, NASA Innovative Advanced Concepts Phase-II (Dr. Dutta, Co-I), 2019-21, Total: $500,000).

Opportunity for Mentorship & Grant Writing: extensive grant writing experience will be invaluable in mentoring junior faculty in research and grant writing, which he has already been doing in his department (DoD project with Rattani, NSF NRT project with Salinas to name a few). More importantly, the thrusts in this project are organized so that each thrust has a senior professor with extensive funding and research experience; Alagic, Rimmington, Bagai, and KC will mentor other team members (junior faculty and graduate students) in grant writing, project management, evaluation, budget management, reporting, and conducting interdisciplinary research, facilitating tenure-track faculty towards achieving tenure and furthering their careers.

Specialized Knowledge: Each of the participating faculty researchers will contribute their specialist expertise and facilitate transdisciplinarity thinking by explicating disciplinary perspectives so that each member explores the Third Place or interstices among disciplines from where each discipline can be appreciated anew. This will ensure the total outcomes of the project are more than the sum of individual disciplinary activities, by emphasizing interdisciplinary understanding, synergies, and synthesis of novel hybridity emerging from specialized disciplinary perspectives of team members.

Co-Development of Research Infrastructure: Each team member will learn more about the infrastructure and expertise of others, and gaps or needs for upgraded infrastructure will be identified. For example, the sustained operation and availability of the digital platform may be enhanced with access to dedicated CubeSat networks or regular UAV overflights, carrying multiple sensor platforms; the 'User Interface and Design' group which is mainly responsible for designing the 'digital platform' pulls in faculty from various research areas. Moreover, with our NetApp partner, there is a possibility of enhancing our HPC System (BeoShock) to the next level in regards to hybrid cloud concepts and data storage which can then be available beyond the participating faculty to other WSU researchers.

Organizational & Management Plan: PI KC will be responsible for the overall management of the project with help from all the Co-PI's and co-Directors. At each major step of the project work, expertise in these areas will be applied and their interactions explicated. The participation of other faculties is mentioned in the individual thrust. We will also have a *steering committee* that includes our KBOR collaborator Dr. Caragea and our innovation campus partner NetApp. This steering committee will advise the research cluster in various strategic initiatives.

Existing Infrastructure, BeoShock, plus access to BeoCat, KanRen, Open Source Grid and XSEDE. Our anticipated partnership with NetApp may provide additional storage needed for housing large databases and archives. Besides, each of the faculty has their lab and computing infrastructure. e.g. KC has a lab in Wallace Hall 309 located on the main campus on Wichita State University. It is a 400 Sq. ft lab and is equipped with 8 Dell Precision T1700 Workstations with 16GB memory.

e. Budget and return on investment (No limit)

The participating faculties understand that this is a pilot project and that the focus of the budget should be to help nurture the research cluster. Hence, the cluster puts the emphasis on student education, research and training and only students are budgeted in this project. In addition, it's worth mentioning that PI KC has summer support for next 3 years from other grants/resources.

Budget

Item **First Year**

1. One Ph.D. level graduate student from Engineering who will be responsible for overall aspects of the project under the guidance of PI's and Co-PI's and one MS student from Engineering is budgeted who will work in research Thrust 1 and Thrust 3. The new RTT requirement of paying at least $25K for a Ph.D. student is met. The stipend for a Ph.D. level student is $25,261 and the stipend for a M.S. level student is $12,381. The tuition is also budgeted for these students. Additional $50/cr Hr is budgeted for Engineering students **Amount: $53,251**.
2. Two Masters level graduate students who will work on Thrust 2 and Thrust 3 are budgeted. Just like the above, their tuition, stipend and fringes are budgeted. **Amount: $38,571**
3. Travel money in the amount of $8,178 is budgeted for PI's and co-PI's to travel to workshops and for the purpose of data collection. **Amount: $8,178**

Total: $100K

Item **Second Year**

1. One Ph.D. level graduate student from Engineering who will be responsible for overall aspects of the project under the guidance of PI's and Co-PI's and one MS student from Engineering is budgeted who will work in research Thrust 1 and Thrust3. Additional $50/cr Hr is budgeted for Engineering students. **Amount: $54,849**
2. Two Masters level graduate students who will work on Thrust 2 and Thrust 3 are budgeted. This includes their tuition, stipend and fringes. **Amount: $39,727**
3. Travel money in the amount of $5,424 is budgeted for PI's and co-PI's to travel to workshops and for the purpose of data collection. **Amount: $5,424**

Total: $100K

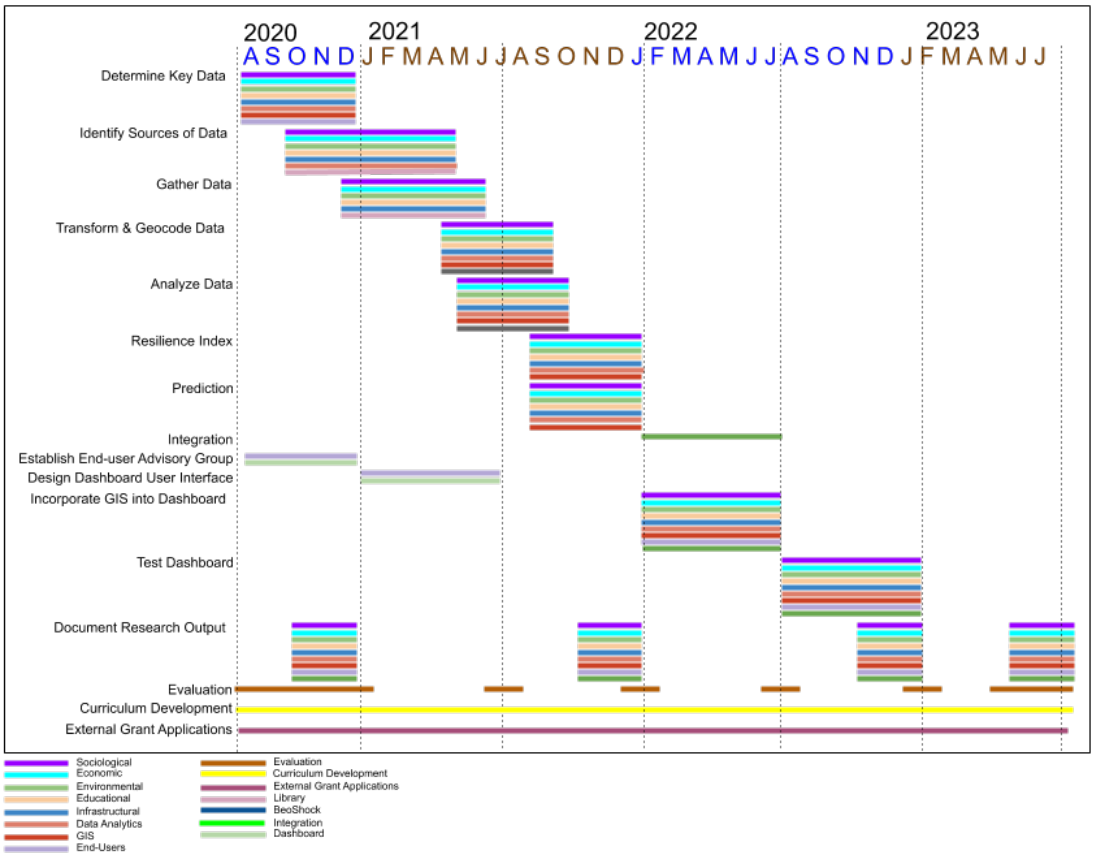
Item **Third Year**

1. One Ph.D. level graduate student from Engineering who will be responsible for overall aspects of the project under the guidance of PI's and Co-PI's and one MS student from Engineering is budgeted who will work in research Thrust 1 and Thrust3. Additional $50/cr Hr is budgeted for Engineering students. The new RTT requirement of paying at least $25K for Ph.D. student is met. **Amount: $56,920**
2. Two Masters level graduate students who will work on Thrust 2 and Thrust 3 are budgeted. This includes their tuition, stipend and fringes. **Amount: $40,492**
3. Travel money in the amount of $2,588 is budgeted for PI's and co-PI's to travel to workshops and for the purpose of data collection. Amount **$2,588**.

Total: $100K

Grand Total: $300k for 3 years.

Timeline:



Anticipated Returns

Although, intangible returns on investment are not easily monetized for the proposed research cluster, we envision accomplishing the following:

1) One Ph.D. graduate with experience working in and overseeing a unique, large, interdisciplinary project with both practical output and scientific publications
2) 3 Masters graduates, with experience working with other MS candidates and faculty researchers with a unique combination of expertise and in the process, developing advanced interdisciplinary learning and communication competence
3) Mentoring of eight tenure-track research faculty through to achieving tenure and promotion, while learning more about grant writing, project management, and interdisciplinary communication and collaboration
4) An opportunity for six tenured faculty to be mentored towards full professorship with experience in and publications from a large, externally-funded interdisciplinary project
5) A Digital Platform including but not limited to a dashboard with integrated predictive and resilience assessment capabilities to save lives and to minimize socio-economic, ecological, and infrastructural effects of various disaster scenarios
6) Numerous other possibilities of this group to attract a considerable amount of new external funding

7) Potential for an even stronger partnership with our innovation campus partner NetApp and possible research collaboration.
8) Potential for collaboration with weather company AccuWeather.
9) Potential for partnership with other stakeholders, local and state government agencies.

f. Identifying gaps in expertise

Managing the risks of a natural disaster involves research in the following four phases: mitigation, resilience (preparedness), recovery, and response. As outlined in the project proposal, the long-term vision of the cluster is to work on all these four phases. This will involve extensive collaboration between faculty members with various background knowledge and experience. For the current proposal, the objectives are to work on *mitigation* and *resilience*. Although we have expeditiously worked on assembling a group of faculty representing various disciplines including but not limited to Data Engineering, Data Science, High-Performance Computing, Sociology, Economics, Education, Geology, Environmental Science, UAV, Satellite Imaging, Image Processing, and Library Science, we still perceive a few gaps in faculty expertise notably in the following areas (Fig. 5) especially when we begin expanding our efforts to include the remaining two phases, *recovery* and *response*.

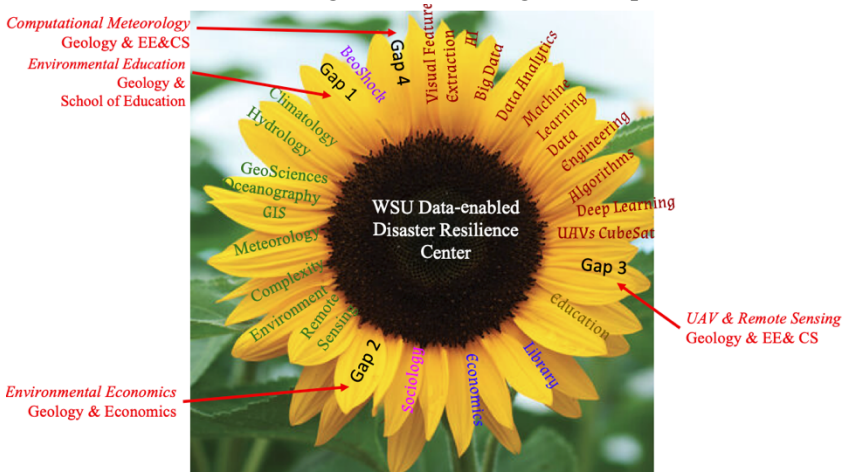


Figure 5 Gaps in multidisciplinary expertise and departments for combined tenure

1) **Geology, STEM education and outreach faculty** – Disaster management needs active collaboration between all the stakeholders. In that regard, a faculty with expertise in Geology and STEM education would be an integral part of the cluster. That faculty should be hired in two colleges, Liberal Arts and Sciences (Geology Department) and College of Applied Studies (School of Education)
2) **Environmental Economics faculty shared between LAS + BUS** – A faculty with expertise in Environmental Economics would be a good addition to the group.
3) **Drone-based Geology faculty shared between LAS + ENG** – A faculty who has expertise in working/studying Geology/Meteorology from using Drones/UAVs would be a good addition to the group. Dutta is one of our specialists in UAVs and Satellite images and we believe we can use some more expertise in that area.
4) **Computational Meteorology faculty shared between LAS + ENG** - A faculty whose expertise is Computational Meteorology and shared between LAS+ENG would be a good addition to the cluster.

A faculty who has expertise in working/studying recovery would be a big asset to the project. For the long term plan, we also realize that we need someone who has experience in Disaster Recovery. In that regard, our group members have been already reaching out to Dr. Chuck Koeber who has extensively studied the recovery of Greensburg from a large tornado that destroyed the town in 2007. In addition, we need to be working very closely with meteorologists and KC has been working with Tyler Dewvall at AccuWeather and there is a possibility that the collaboration will grow further with this project.

g. Curricular implications

A significant portion of this project will include interdisciplinary teamwork on projects' instructional and curricular design for the dissemination and implementation in various formal and informal educational settings as well as for general public understanding (e.g., industry, government, non-governmental organizations). This will include widely sharing information related to the use of a digital platform with an embedded GIS that can be used for the prediction of specific disasters and assessment of resilience aspects. We refer to this aspect as *Resilience literacy regarding natural disasters*.

New graduate certificate In terms of formal educational settings, we will propose **transdisciplinary Graduate Certificate in Resilience vis-à-vis natural disasters** where this convergence exploration and thinking about curricular activities will culminate in 6 CH of required credits of foundational nature grounded in the research and discovery from this project and 6 CH of electives focused more on the specifics (e.g. different for engineering, for teacher preparation, social work…). For curricular purposes of the certificate, consideration will be given to the four dimensions: technical, organizational, social, and economic, reflecting the transdisciplinary work of this project team. The objectives will include (a) Evaluating community resilience using both quantitative and qualitative measures; (b) Exploring corporate social responsibility of the industry and professional organizations (potentially in collaboration with companies located on our campus).

A New Graduate Level Course

1) A *new graduate-level course* on Data Engineering Techniques, to be offered as an elective for MS in Data Science program (Bagai).

2) A new course designation called high-performance computing learning experience (HPCLE). For a course to qualify, a student would need to use HPC resources for a homework assignment (Figy).

3) Related, another idea (Rimmington) a course on Complexity applications as an elective in the EEPS program, with simulators on BeoShock for students to try each type of model: neural networks, cellular automata, L-systems, adaptive networks and evolutionary algorithms.

Updating existing courses and others Considering the way this project/problem is in the cross-section of multiple disciplines, opportunities for applied learning experiences within and related to the project are multiple and they are an essential component of the proposed master's program and new and revised courses listed here.

- Incorporate findings from this research into the *courses on urban sociology and social inequality* (Billingham)
- Develop collaboratively curricular modules that can be delivered to public officials, K-12 school audiences, and the general public to disseminate the group's findings and to promote disaster preparedness and community resiliency (Billingham and Alagic).
- Incorporate a team project related to the monitoring of disasters using Earth-orbiting CubeSat constellations in the graduate course on Nano-satellite Engineering (technical elective for undergraduates). The requirements of data collection will drive the design of the constellation (Dutta).
- Update the Image Analysis and Computer Vision course offered as an elective in the MS in Data Science program (Rattani).
- Update the Machine Learning (CS 697AB) and Deep Learning course (CS898AS) offered in EECS and as an elective in the MS in Data Science program (KC).

h. Sustainability and Impact

Our long-term vision for the proposed 'Data-enabled Disaster Resilience Center (DDRC) at Wichita State University' includes establishing it to be a hub for disaster-related research not only in the state of Kansas but also in the Great Plains region. Many precursory activities for this center have already started: Dr. KC as PI submitted a $6M NSF EPSCOR grant on a related area in February of this year with participants from Kansas State University (Dr. Caragea), Oklahoma State University (Dr. Jacobs), and University of Nebraska Lincoln (Dr. Muhlberger). We intend to maintain this research cluster as sustainable with a very high impact not only on Wichita State University and nearby areas but to the Great Plains, with an imperative emphasis on outreach and involvement of community partners. Hence the name - *creation of a Digital platform ecosystem for Great Plains Disaster resilience***.** We are motivated, enthusiastic, and hopeful to implement these ideas as this is *perhaps the biggest collaborative effort within WSU* where faculty members from various otherwise unrelated fields have come together to solve a *demanding problem of national/international significance*. To this effect, we have identified a starting collection of funding sources (Table 1) with planned submission timeline which *we will continue to expand* as we further develop our expertise and prominence in the field of study.

TABLE 1: LIST OF IDENTIFIED FUNDING MECHANISMS, planned grants are highlighted in bold

Agency	**Programs Listed**	**Submission Planned**
National Science Foundation (NSF)	**Major Research Instrumentation (MRI)** **EPSCoR Track-2** **Transdisciplinary Research in Principles of Data Science Phase II (TRIPODS)** **Research Traineeship (NRT) -** *Other possible Funding Mechanisms* Climate and Large-Scale Dynamics (CLD), Competition for the Management of Operations and Maintenance of the National Ecological Observatory Network (NEON), Environmental Sustainability, Campus Cyberinfrastructure (CC*), Computational and Data-Enabled Science and Engineering (CDS&E), Faculty Early Career Development Program (CAREER), Critical Aspects of Sustainability (CAS), Critical Aspects of Sustainability (CAS), Cyberinfrastructure for Emerging Science and Engineering Research (CESER), Critical Aspects of Sustainability (CAS), Long-Term Ecological Research (LTER), HR Core Research (ECR): Building Capacity in STEM Education Research (ECR: BCSER), HR Core Research (ECR): Building Capacity in STEM Education Research (ECR: BCSER), CubeSat-based Science Missions for Geospace and Atmospheric Research, NSF Earth Sciences (EAR/IF), Sociology, EPSCoR Track-3,	Feb 2021 Jan 2021 Feb 2022 Feb 2023
NASA	**Kansas NASA EPSCoR Program (KNEP) PDG** **Kansas NASA EPSCoR Program SRI** **1 NASA EPSCOR CAN** **2 NASA FINESST submissions**, 2 NASA non-EPSCOR submissions for SMD/STMD	May 2021 May 2022 May 2022 May 2023
Other Foundations	Landscape Conservation Catalyst Fund - General http://landscapeconservation.org/catalyst-fund/ Innovation Grant Leonardo DiCaprio Foundation https://www.leonardodicaprio.org/ai-for-earth/	
NOAA	**Earth System Science and Modeling (ESSM)** **Climate and Societal Interactions (CSI)** **Communication, Education, and Engagement (CEE).**	 Sep 2022 Sep 2023

Expected outcomes and Impacts of the cluster after Years 1, 2, and 3 and beyond

1. **Increased external Grants and contracts**

With a succinct timeline for grant submission and previous experience of the PI's and the Co-PIs the cluster is expected to secure more external grants and contracts in the area of Disaster Management, Data Science, Computing Infrastructure, Education and others. Here, we just outline anticipated grants for one co-PI: **Anticipated RoI from NASA projects:** 135K+15K+100K+ (250K to 750K) = $500,000 to $1,000,000 **Anticipated grants to secured:**1 NASA Earth Science FINESST grant OR 1 NASA STMD Graduate Research Fellowship = $135,000

2. **Increased prominence of WSU and economic benefits to Wichita and Kansas**

Remote sensing using drones or nano-satellites presents new opportunities for the state of Kansas, which is already a worldwide leader in aeronautics owing to the large presence of aircraft manufacturing companies. Success in our project can identify new business opportunities in the area of Unmanned Aerial Systems, potentially leveraging the existing aeronautics infrastructure in the state. Space-based remote sensing also has a lot of potentials. While astronautics is not as strong as its aeronautics counterpart in the state, there are a few players already engaged in the field. For instance, Smiths Interconnect (Kansas City, KS) is a leading provider of electronic components and has clients who operate Earth-orbiting satellites, while Garmin International, Inc. (Olathe, KS) is a manufacturer of GPS receiver systems. Most importantly, the state has recently shown significant interest in the development of space infrastructure as well. Specifically, the Kansas Department of Commerce launched a new marketing campaign in 2017 to attract companies that build satellites and other space-bound objects (see the news article "Kansas looks to 'outer space' for jobs with the new initiative"). To this end, the proposed project (and follow-up on research grants funded by NASA and NOAA) can lay a strong foundation for the state of Kansas to engage in the *space business* providing for remote sensing needs for disaster management.

3. **Increase community Engagement**

The development of research and teaching infrastructure is one of the most significant contributions of this project to WSU. On one hand, the established research infrastructure will be leveraged to bring in research dollars in the newly established area of disaster management. On the other hand, parallel with that, related educational advancement and outreach to the community will significantly contribute not only to Kansas but also to neighboring states and beyond, through enhanced awareness on preparedness mechanisms to deal with disasters.

4. **Contribution to Scientific body of Knowledge through Dissemination**

In addition, all the members involved in the consortium have track-records (please refer to CVs) of disseminating their research findings using various scientific journals, conference proceedings and other avenues. In this regard, we expect to serve the scientific community of publishing our research findings in various journals including but not limited to Scientific Reports, International Journal of Disaster Risk Reduction, IEEE Access, Weather and Climate Extremes, Review of Environmental Economic and Policy, Sustainability and others. In addition, Rimmington and Alagic have already written few books and the findings of the project could also be published as a book.

i. Intra-KBOR Collaboration

From Facebook to Twitter, Instagram, YouTube, social media has become ubiquitous. The use of social media is particularly prevalent during emergencies. Social media offers participatory and collaborative structure and collective knowledge building capacity to the public information and warning approaches. In that regard, an intelligent and effective system based on social media has three functions: (1) efficiently and effectively acquiring disaster situational awareness information, (2) supporting self-organized peer-to-peer help activities, and (3) enabling the disaster management agencies to hear from the public. Social media platforms have been contributing to disaster management during the past several years. First-hand information produced by people in the affected areas is especially valuable as such information cannot be easily obtained from other sources. For instance, the Federal Emergency Management Agency (FEMA) wrote in its 2013 National Preparedness report that during and immediately following Hurricane Sandy in 2012 "users sent more than 20 million Sandy-related Twitter posts, or *tweets*, despite the loss of cell phone service during the peak of the storm." Such huge amounts of user-generated data contributed by disaster-affected communities have become an important source of big crisis data for disaster response. Many research and practical studies have proved the value of social media data on disseminating warning and response information, enhancing situational awareness, facilitating the allocation of resources, informing disaster risk reduction strategies and risk assessments as well as increasing resilience.

One of the perceived gaps in the proposed project is somewhat lack of expertise in social-media data analysis especially related to disaster prediction/mitigation. In this regard, we have formed a strong partnership with Dr. Doina Caragea at Kansas State University who is one of the pioneers in social media data analytics related to Disaster prediction/mitigation. She has more than 170 publications in various topics related to text mining and other aspects of data mining. Most recently, her research work is focused on the use of social media data analysis to monitor/mitigate disasters. Moreover, Dr. Caragea has given invited talks related to her research on "Collecting, Processing and Analyzing Crisis Data to Enhance Situational Awareness" for several groups and institutions including the 2016 Annual Meeting of the Statistical Society of Canada (June 2016), the Kansas City Machine Learning Group's monthly meeting (February 2017), Workshop on Using Aerial and Social Media Images for Humanitarian Aid, Qatar Computing Research Institute (June 2018), NSF-DOE Center for Ultra-wide-area Resilient Electrical Energy Transmission Networks (CURENT), University of Tennessee (October 2018), ISU's Comp Sci 50th Anniversary, Iowa State University (September 2019). In addition, Dr. Caragea is the PI of BIGDATA: IA: Collaborative Research: Domain Adaptation Approaches for Classifying Crisis Related Data on Social Media (NSF IIS-1741345, $500,000, 01/01/2019- 12/31/2021). The research provides novel solutions based on domain adaptation and deep neural networks to tackle the unique challenges in applying machine learning for crisis-related data analysis.

Role of Dr. Caragea:

As mentioned above, the expertise of Dr. Caragea will be invaluable in integrating the plethora of data from social media to help in the proposed project. She will serve as a member of the steering committee which will meet biannually. It has to be highlighted here that Dr. Caragea is already involved in a significant research collaboration with KC as she is co-mentoring one of KC's students.

In addition, PI KC has also developed a strong collaboration with Dr. Daniel Andersen who is the Director of HPC at Kansas State University. KC has also developed a strong relationship with Dr. Jamey Jacobs at Oklahoma State University who is an expert in UAS/UAVs. Similarly, he has also developed a strong working relationship with Dr. Muhlberger at the Public Policy Institute at the University of Nebraska at Lincoln. Most importantly, Dr. KC submitted an NSF EPSCOR RII Track-2 proposal focused on harnessing the data revolution as lead PI involving Dr. Caragea, Dr. Jacobs, and Dr. Muhlberger.

Facilities available for Dr. Caragea:

High Performance Computing

Beocat, the KSU research computing cluster, is currently the largest academic supercomputer in Kansas. Its hardware includes nearly 400 researcher-funded computers, approximately 3.3PB of storage and ~8,200 processor cores on machines ranging from dual-processor Xeon e5 nodes with 128GB RAM with 100GbE to six 80-core Xeons with 1TB RAM connected by 40-100Gbps networks (thus 40-100x faster than Google Fiber). Beocat is available to any academic researcher in Kansas and their partners under the statewide KanShare MOU.

KSU Machine Learning and Data Science Laboratory

The Machine Learning and Data Science Laboratory led by Dr. Caragea is housed in a new building and has 1335 square feet space, which consists of student cubicles (all equipped with Linux and/or Windows workstations) and a meeting room. The Laboratory is equipped with the following GPU servers, which will be used to train and test deep learning models developed in the project: 1) Dell PowerEdge T630 Server (with NVIDIA Tesla K40C GPU, 4TB of storage space, and 4*32GB RDIMM); 2) Dell Precision 7920 Tower Server (Dual NVlink NVIDIA Quadro GP100 GPU, 10TB of storage space, and 12*16GB RDIMM). In addition, the laboratory is equipped with an iMacPro (Intel Xeon W, 3.2 GHz, 8 cores, 128 GB RAM, 1TB storage space), and two GPU Linux workstations (i7 CPU, EVGA GeForce GTX1080 Ti, 32GB RAM, 2TB 2 HDD, 480GB SSD, 1000W PSU), which will also be used for the project.

KSU Center for Artificial Intelligence and Data Science (CAIDS)

CAIDS has research strengths on topics in data science, including the application of AI methods to data collection, management, analysis, and data security, along with data-intensive AI methods such as those based on machine learning or statistical analysis.

j. Innovation campus involvement.

The following section has been provided by Stan Skelton, Sr. Director, Business Development and Chief Architect at NetApp in response to the request to participate and collaborate in the proposal:

This convergence science cluster will have NetApp as one of the innovation campus partners. NetApp is a founding member of FlagshipKansas.Tech (https://www.flagshipkansas.tech/), a technology council representing the technical industry in Wichita and the surrounding area. NetApp is the leader in cloud data services, empowering global organizations to change their world with data. Together with their partners, they are the only ones who can help enterprises build unique data fabric. Especially, NetApp is known for technology to Simplify hybrid multi-cloud and securely deliver the right data, services and applications to the right people at the right time.

Recently, NetApp announced it will move its Wichita operations to the WSU Innovation Campus, the _https://www.wichita.edu/about/wsunews/wsu_today/2020/05-may/05-29-20_wsut.php#netapp The group in Wichita has a long history of strong relationships with Storage System Research groups at many of the major universities such as Carnegie-Mellon, UC Santa Cruz, UC Berkeley, UC Minn, and UN-Lincoln. An extension of this is the long-term relationship with Wichita State University (WSU). A recent decision by NetApp was to move to the Innovation Campus at Wichita State to strengthen our partnership with WSU. Examples of the partnership include but are not limited to:

- Establishment of the Ennovar partnership, leading to being the first company in the Innovation Campus
- Active member and co-chair of the EE/CS Industrial Advisory Board
- Sponsorship of the NetApp/WSU scholarship
- Internships and part-time employment opportunities
- Workshops and special lectures

The site hosts a variety of disciplines, functions and product lines. One of the primary product lines is the E-Series. The E-Series product line. A major focus area of this product line is High-Performance Computing and AI. The majority of the product group and supporting organizations reside in Wichita, Kansas. This site is multi-disciplined and hosts two other product groups as well as one of the major 24x7 global support groups for NetApp.

As the convergence science proposal focuses on data-enabled disaster resiliency prediction/assessment, the data storage, data analysis, prediction, machine learning, deep learning and high-performance computing are the focus area of the proposal. Since one of the focus of the research cluster is on High Performance Computing and AI, the role of NetApp with respect to the referenced proposal would be of immense value. NetApp will assign an appropriate person to act as an advisor. The advisor will meet once a quarter with the PI's of the proposal. This advisor role will include introductions to other groups or expertise at NetApp as required in the project. The participation of NetApp in the cluster will be invaluable in advising on the required infrastructure and review of various ecosystem partners for the upper level data management and data analysis software. The collaboration will provide the research cluster advice on how to setup the most efficient infrastructure for collecting the multitude of data including but not limited to sensor data, UAV data, social media data, and others. The advisor will also help with informing the cluster with state-of-the best practices, efficient ways to integrate with high performance computing, and other potential technologies for efficient storing of the data.

Other possible partners: Talks are in the initial phase with Tyler Dewvall at AccuWeather to partner with AccuWeather so that the research cluster can have access to very important weather data. In the past, the PI KC has worked with Rosemary Radich (Past Director of Data Science at AccuWeather who recently left AccuWeather) on various collaborative projects and we hope to establish partnership with AccuWeather soon.

APPENDIX

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52. Zhu, L.H., Zhao, X.C., Lai, L.M., Wang, J.J., Jiang, L.H., Ding, J.Z., Liu, N.X., Yu, Y.J., Li, J.S., Xiao, N.W., Zheng, Y.R., & Rimmington, G.M. (2013). Soil TPH Concentration Estimation Using Vegetation Indices in an Oil Polluted Area of Eastern China. Public Library of Science One, 8(1), 1-12. E54028.

2. CVs

K.C., Dukka PI Associate Professor and Director for Data Analytics - EE&CS, CoE
Rattani, Ajita Assistant Professor of Computer Science - EE&CS, CoE
Sinha, Kaushik *Associate Professor of Computer Science* - EE&CS, CoE
Bagai, Rajiv *Professor of Computer Science* - EE&CS, CoE
Dutta, Atri *Associate Professor of Aerospace Engineering* - Aerospace Engineering, CoE

Demissie, Zelalem Co-PI *Assistant Professor of GeoSciences* - Geology Dept., LAS
Rimmington, Glyn *Distinguished Professor of Global Learning* - Geology Dept., LAS
Billingham, Chase Co-PI *Associate Professor of Sociology* - Sociology Dept., LAS
Figy, Terrance *Assistant Professor of Physics* - Mathematics, Statistics & Physics Dept., LAS

Alagic, Mara Co-PI *Professor of Education* - School of Education, CAS

Rai, Atul *Larry Jones Faculty Fellow & Associate Professor of Accounting* - Accounting Dept., Barton School of Business

Filbert, Nathan *Assistant Professor in Instruction & Research Services* - University Libraries
Kuhlmann, Meghann *Assistant Professor in Instruction and Research Services* - University Libraries
Bowen, Aaron *Assistant Professor in Instruction and Research Services* - University Libraries
Sclafani, Maria *Assistant Professor in Instruction and Research Services* - University Libraries

Lindsay, Ethan *Assistant Professor Instruction and Research Services*, University Libraries
Matveyeva, Susan *Associate Professor & Catalog & Institutional Repository Librarian,* University Libraries

NAME: Dukka B KC

POSITION TITLE & INSTITUTION: Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Kyoto University	Kyoto, Japan	Computer Science	B.E.	2001
Kyoto University	Kyoto, Japan	Informatics	M.Inf.	2003
Kyoto University	Kyoto, Japan	Informatics	Ph.D.	2006
Georgia Institute of Technology	Atlanta, GA	Bioinformatics	Postdoc	2007

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2019-Present	Associate Professor and Director for Data Analytics; Electrical Engineering and Computer Science Department; Wichita State University; Wichita, KS.
2018 - 2019	Associate Professor and Graduate Program Director; Computational Science and Engineering Department; North Carolina Agricultural and Technical State University (NC A&T); Greensboro, NC.
2012 - 2018	Assistant Professor and Graduate Coordinator; Computational Science and Engineering Department; NC A&T; Greensboro, NC
2011 - 2012	Bioinformatics Analyst, Center for Information Technology (CIT), National Institutes of Health (NIH), Bethesda, MD
2009 - 2011	Cancer Research Teaching Award Fellow; National Cancer Institute (NCI), NIH, Bethesda, MD
2007 - 2009	Research Associate; University of North Carolina-Charlotte; Department of Bioinformatics and Genomics, Charlotte, NC

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

1. Ismail HD, Newman RH, KC DB, RF-hydroxysite: a random forest based predictor for hydroxylation sites, Mol BioSystems, 2016, DOI: 10.1039/C6MB00179C.
2. White C, Ismail H, Saigo H, KC DB, CNN-BLPred: A convolutional neural network based predictor for Beta Lactamases and their classes, BMC Bioinfo, 18(Suppl 16):577, 2017.
3. Albarakati HJ, McConnell EW, Hicks LM, Poole LB, Newman RH, KC DB, SVM-Sulfosite: A support vector machine based predictor for sulfenylation sites, Scientific Reports, 8, 11288, 2018.
4. Thapa N, Chaudhari M, McManus S, Roy K, Newman RH, Saigo H, and KC DB, "DeepSuccinylSite: a deep learning based approach for protein succinylation site prediction," BMC Bioinformatics, 21:63, 2020.
5. Albarakati H, Thapa N, Saigo H, Roy K, Newman RH, KC DB, “RF-MaloSite and DL-MaloSite: Methods based on random forest and deep learning to identify malonylation sites, Comput. Struct. Biotechnol. J., 18:852-860, 2020.

Other Significant Products, Whether or Not Related to the Proposed Project

1. KC DB, Livesay DR. Improving position-specific predictions of protein functional sites using phylogenetic motifs. Bioinformatics, 24(20): 2308-2316, 2008.
2. KC DB, Livesay DR. Topology improves phylogenetic motif functional site predictions. IEEE/ACM Trans Comput Biol Bioinform, 8(1): 226-233, 2011.
3. KC DB, Structure-based methods for computational protein functional site prediction. Comput Struct Biotechnol J, 8:e201308005, 2013.
4. Tai CH, Paul R, KC DB, Shilling JD, Lee B. SymD webserver: a platform for detecting internally symmetric protein structures, Nucleic Acids Res, 2014,W296-300.
5. KC DB, Recent advances in sequence-based protein structure prediction, Briefings in Bioinformatics, 2016, 1-12.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

• Development of research tools: Actively developing various computational research tools and making it available for the researchers as a stand-alone web-server or stand-alone package in github.
• Broadening the participation of underrepresented in STEM: As a Graduate Program Director of Computational Science and Engineering Ph.D. program at previous institution (NC A&T) actively engaged in recruitment, guidance and retention of African American Students in STEM.
• Service to the scientific community as an Associate Editor for the BMC Bioinformatics Journal.
• Founding XSEDE Campus Champion: Served as the founding XSEDE Campus Champion at North Carolina A&T state university and member of HPC Committee at Wichita State University.

AJITA RATTANI, PhD.

A. Professional Preparation

Ministry of Communications and Information Technology	New Delhi, India	Computer Science	BS 2003
Ministry of Communications and Information Technology	New Delhi, India	Computer Science	MS 2005
University of Cagliari	Cagliari, Italy	Computer Science and Engineering	PhD 2010
University of Cagliari	Cagliari, Italy	Biometrics/ AI	Post-doc 2010 - 2012
Michigan State University	East Lansing, MI	Biometrics/ AI	Post-doc 2013 - 2014

B. Appointments

2019 - Current *Assistant Professor*, Electrical Engineering and Computer Science Department, Wichita State University, Wichita, KS

2014 – 2018 *Adjunct Professor,* Computer Science and Electrical Engineering Department, University of Missouri - Kansas City, Kansas City, MO

C. Products

(i) *Products Most Closely Related to Proposed Project*

1. **A. Rattani**, R. Derakhshani and A. Ross (editors), "Selfie Biometrics: Advances and Challenges", Springer International Publishing, 2019
2. **A. Rattani**, R. Derakhshani, "A Survey of mobile face biometrics", Elsevier Computers & Electrical Engineering, 72, pp. 39-52, 2018
3. **A. Rattani**, N. Reddy and R. Derakhshani, "Multi-biometric Convolutional Neural Networks for Mobile User Authentication", IEEE International Symposium on Technologies for Homeland Security (HST), Woburn, MA, pp. 1-6, 2018
4. **A. Rattani**, N. Reddy and R. Derakhshani "Convolutional Neural Networks for Gender Prediction from Smartphone-based Ocular Images", IET Biometrics, 7 (5), pp. 423-430, 2018
5. **A. Rattani**, R. Derakhshani, S. K. Saripalle and V. Gottemukkula, "ICIP 2016 Competition on Mobile Ocular Biometric Recognition", IEEE International Conference on Image Processing (ICIP), Phoenix, AZ, pp. 320-324, 2016

(ii) Other Significant Products

1. H. Nyugen, **A. Rattani** and R. Derakhshani, "Biometric Fusion with Applications in Passenger Re-authentication for Automated Border Control Systems", IEEE International Symposium on Homeland Security (HST), Woburn, MA, pp.1-6, 2019
2. **A. Rattani**, N. Reddy and R. Derakhshani, "Convolutional Neural Network for Age Classification from Smart-phone based Ocular Images", IEEE International Joint Conference on Biometrics (IJCB*)*, Denver, CO, pp. 756-761, 2017
3. N. Poh, J. Kittler, **A. Rattani** and M. Tistarelli, "Group-specific score normalization for biometric systems," IEEE Computer Society Conference on Computer Vision and Pattern Recognition - Workshops, San Francisco, CA, pp. 38-45, 2010.
4. A. Ross, **A. Rattani** and M. Tistarelli, "Exploiting the "doddington zoo" effect in biometric fusion," IEEE 3rd International Conference on Biometrics: Theory, Applications, and Systems, Washington, DC, pp. 1-7, 2009
5. D. R. Kisku, **A. Rattani**, E. Grosso and M. Tistarelli, "Face Identification by SIFT-based Complete Graph Topology", 2007 IEEE Workshop on Automatic Identification Advanced Technologies, Alghero, pp. 63-68, 2007

D. Synergistic Activities

1. Filed a **patent** titled **"**Authentication Verification Using Soft Biometric Traits", Application No.16361038 and Confirmation No. 4732
2. Member of the **National Society of Black Engineers** at Wichita State with the mission to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally and positively impact the community
3. Advisor to the **Society of Women Engineers** at Wichita State with the mission to stimulate women to achieve their full potential as engineers and leaders, and demonstrate the value of diversity
4. Member of the **IEEE HKN** student chapter at Wichita State in order to encourage and acknowledge excellence in students in the field of computer science, electrical engineering and participate in K-12 outreach activities
5. Editorial **Board Member** and IEEE Biometric Council's representative to the IEEE Young Professionals.

NAME: Kaushik Sinha

POSITION TITLE & INSTITUTION: Assoc. Professor, Wichita State University

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
NIT Warangal, India	Telangana, India	Mechanical Eng	B.Tech	1997
IIT Kanpur, India	Uttar Pradesh, India	Mechanical Engg./Robotics	M.Tech	1999
Ohio State University	Columbus, OH	Computer Science	M.S.	2009
Ohio State University	Columbus, OH	Computer Science	Ph.D.	2010

B. APPOINTMENTS

(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2019-Present	Associate Professor of Electrical Engineering and Computer Science, Wichita State University (WSU), Wichita, KS
2013-2019	Assistant Professor of Electrical Engineering and Computer Science, Wichita State University (WSU), Wichita, KS
2011-2012	Post Doctoral Scholar in the Department of Computer Science and Engineering at University of California San Diego, San Diego, CA

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

1. P. Ram and K. Sinha, Revisiting kd-tree for nearest neighbor search, 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2019.
2. O. Keivani and K. Sinha, Improved nearest neighbor search using auxiliary information and priority functions, 36th International Conference on Machine Learning (ICML), 2018.
3. O. Keivani, K. Sinha and Parikshit Ram, Improved maximum inner product search with better theoretical guarantee using randomized partition trees, Machine Learning 107(6), 1069-1094, 2018.
4. K. Sinha and O. Keivani, Sparse randomized partition trees for nearest neighbor search, 20th International Conference on Artificial Intelligence and Statistics (AISTATS), 2017.
5. S. Dasgupta and K. Sinha, Randomized partition trees for exact nearest neighbor search, 26th Annual Conference on Learning Theory (COLT), 2013.

Other Significant Products, Whether or Not Related to the Proposed Project

•1. K. Sinha, K-means clustering using random matrix sparsification, 36th International Conference on Machine Learning (ICML), 2018.
2. M. Belkin and K. Sinha, Polynomial learning of distribution families, SIAM Journal on Computing 44(4), 889-911, 2015.
3. K. Chaudhuri and A. Sarwate and K. Sinha, Near-optimal algorithms for differentially private principal components, Journal of Machine Learning Research, 14(Sep), 2905-2945, 2013.
4. K. Chaudhuri and A. Sarwate and K. Sinha, Near-optimal differentially private principal components, 26th Annual Conference on Neural Information Processing Systems (NIPS), 2012

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

1. Served as Technical Program Committee Member of International Conference on Association for Advancement of Artificial Intelligence (AAAI): 2017-2020.
2. Served as Reviewer of Annual Conference on Neural Information Processing Systems (NIPS): 2008-2019
3. Received IEEE-HKN Outstanding Faculty Nicola Tesla Award, Wichita State University (2019).
4. Served as an Associate Editor of Neurocomputing Journal (2014-2016).
5. Developed new graduate/undergraduate course “Machine Learning” (CS 697AB) at Wichita State University (2014).

NAME: Rajiv Bagai

POSITION TITLE & INSTITUTION: Professor, Dept. of Electrical Engr. & Computer Science (CoE), WSU

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Birla Institute of Technology and Science	India	Computer Science	B.Sc.	1983
University of Victoria	Canada	Computer Science	M.S.	1986
University of Victoria	Canada	Computer Science	Ph.D.	1990

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
August 2019 - Present	Professor, Department of Electrical Engineering & Computer Science (CoE), WSU
August 2008 - August 2019	Associate Professor, Department of Electrical Engineering & Computer Science (CoE), WSU
August 2004 - August 2008	Department Chair & Associate Professor, Department of Computer Science (LAS), WSU
August 1996 - August 2004	Associate Professor, Department of Computer Science (LAS), WSU
August 1990 - August 1996	Assistant Professor, Department of Computer Science (LAS), WSU
November 1983 - August 1985	Programmer/Analyst, Tata Engineering & Locomotive Company, India

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

1. R. Bagai, N. Malik, and M. Jadliwala. Measuring Anonymity of Pseudonymized Data after Probabilistic Background Attacks. IEEE Transactions on Information Forensics and Security, vol. 12, no. 5, pp. 1156-1169, 2017.

2. (Best Paper Award, out of 106 papers at conference) R. Bagai and B. Tang. Data Caching for Enhancing Anonymity. In Proceedings of the 25th IEEE International Conference on Advanced Information Networking and Applications (AINA-2011), Singapore, pp. 135-142, 2011.

3. N. Tran and R. Bagai. Efficient Representation and Algebraic Manipulation of Infinite Relations in Paraconsistent Databases. Information Systems Journal, vol. 25, no. 8, pp. 491-502, 2000.

4. R. Bagai and R. Sunderraman. Bottom-Up Computation of the Fitting Model for General Deductive Databases. Journal of Intelligent Information Systems, vol. 6, no. 1, pp. 59-75, 1996.

5. R. Bagai and R. Sunderraman. A Paraconsistent Relational Data Model. International Journal of Computer Mathematics, vol. 55, no. 1, pp. 39-55, 1995.

Other Significant Products, Whether or Not Related to the Proposed Project

1. (Best Paper Award, out of 34 papers at conference) H. Lu and R. Bagai. Cache Enhanced Anonymity Systems Against Probabilistic Attacks. In Proceedings of the 25th International Conference on Computer Networks (CN-2018), Gliwice, Poland, pp. 323-332, 2018.

2. R. Bagai, B. Tang, and E. Kim. Effectiveness of Probabilistic Attacks on Anonymity of Users Communicating via Multiple Messages. IEEE Systems Journal, vol. 7, no. 2, pp. 199-210, 2013.

3. R. Bagai and R. Sunderraman. Computing the Well-Founded Model of Deductive Databases. International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems, vol. 4, no. 2, pp. 157-175, 1996.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

1. Served as PI on several externally-funded contracts and grants with industry and government, such as:

Azusa Pacific University	Adaptive Data Preservation	Jul 2012 - Jun 2013	$43,967
US Navy Engr. Logistics Office	Web Anonymizer Design	Jan 2009 - Mar 2011	$425,292
Boeing Defense & Space Group	Zbra Virtual Machine	Jun 2000 - Dec 2001	$76,651
National Science Foundation	Paraconsistent Data Models	Aug 1996 - Jul 1998	$134,671
Boeing Defense & Space Group	Commercial Aircraft Software	Mar 1996 - Jul 1997	$73,691
Boeing Defense & Space Group	Military Aircraft Software	Mar 1996 - Mar 1997	$47,815

2. Supervised research of over 50 graduate students, as PhD dissertations, MS theses, and MS projects.

NAME: ATRI DUTTA

POSITION TITLE & INSTITUTION: ASSISTANT PROFESSOR (ASSOCIATE FROM FALL 2020), WSU

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Indian Institute of Technology	Kharagpur, India	Aerospace Engineering	B. Tech. (Hons.)	2002
Georgia Institute of Technology	Atlanta, GA	Aerospace Engineering	MS	2005
Georgia Institute of Technology	Atlanta, GA	Aerospace Engineering	PhD	2009

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2014 - 2020	Assistant Professor, Aerospace Engineering, Wichita State University, Wichita KS USA
2018 - 2020 (Summer only)	Visiting Faculty, Information Institute, Air Force Research Laboratory, Rome NY USA
2011 – 2013	Postdoctoral Research Associate, Princeton University, Princeton NJ USA
2009 – 2011	Research Engineer II, Georgia Institute of Technology, Atlanta GA USA
2003 – 2009	Graduate Research/Teaching Assistant, Georgia Institute of Technology, Atlanta GA USA
2002 – 2003	Software Engineer, Geometric Software Solutions Co. Ltd., Pune, India

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

[1] P. Chadalavada*, T. Farabi*, A. Dutta, "Sequential Low-Thrust Orbit-Raising of All-Electric Satellites," MDPI Aerospace, accepted for publication in Special Issue on Electric Propulsion.
[2] S. Sreesawet*, A. Dutta, "Fast and Robust Computation of Low-Thrust Orbit-Raising Trajectories," AIAA Journal of Guidance, Control, and Dynamics, Vol. 41, No. 9 (2018), pp. 1888–1905.
[3] A. Tummala*, A. Dutta, "An Overview of Cube-Satellite Propulsion Technologies and Trends," MDPI Aerospace, Vol. 4, No. 58 (2017), pp. 1–30.
[4] A. Dutta, J. Raquepas**, "Stochastic Optimization Framework for Spacecraft Maneuver Detection," AIAA Scitech, Jan 2020.
[5] L. Arora*, A. Dutta, "Reinforcement Learning for Low-Thrust Orbit Raising Problem," AIAA Scitech 2020.
[6] N. Bascue*, A. Dutta, P. Ghosh**, "Impact of Launch Injection Errors on Orbit-Raising of All-Electric Satellites," AIAA Scitech Forum, Jan 2020.
[7] S. Sreesawet*, A. Dutta, "Receding Horizon Control for Spacecraft with Low-Thrust Propulsion," American Control Conference, Milwaukee WI, Jun 2018.
[8] S. Sreesawet*, V. Pappu, A. Dutta, J. Steck, "Neural Networks Based Adaptive Controller for Attitude Control of All-Electric Satellites," AAS/AIAA Astrodynamics Specialist Conference, Vail CO, Aug 2015.
[9] P. Karampudi*, A. Dutta, "De-Orbit Time Of On-Orbit Debris For Laser-Based Removal Methods," AAS/AIAA Space Flight Mechanics Meeting, San Antonio TX, Feb 2017.
* student authors directly supervised ** government/industry collaborator

Other Significant Products, Whether or Not Related to the Proposed Project

[1] Y. Zhao, A. Dutta, P. Tsiotras, M. Costello, "Optimal Aircraft Trajectories for Wind Energy Extraction," AIAA Journal of Guidance, Control, and Dynamics, Vol. 41, No. 2 (2018), pp. 488–496.
[2] A. Dutta, "A Greedy Random Adaptive Search Procedure for Multi-Rendezvous Mission Planning," AAS/AIAA Space Flight Mechanics Meeting, Williamsburg VA, 2015.
[3] A. Dutta, "Optimal Low-Thrust Orbital Transfers for Rendezvous Between Active Spacecraft with Return Position Constraints," AIAA Guidance Navigation and Control Conference, AIAA SciTech Forum, Jan 2015.
[4] A. Dutta, J. Kasdin, E. Choueiri, P. Francken, "Minimizing Proton Displacement Damage Dose during Electric Orbit-raising of Satellites," AIAA Journal of Guidance, Control and Dynamics, Vol. 39, No. 4, (2016), pp. 963–969

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

PI	Kansas NASA EPSCOR Program SRI	Optimization All-Electric Satellites	2014-15	$119,484
PI	Kansas NASA EPSCOR Program PDG	Hardware-Implementable Algorithms	2018-19	$15,200
PI	NASA FINESST Program	Continuous Monitoring of Hurricanes	2019-22	$135,000
PI	Air Force Research Laboratory	Optimization Maneuver Detection	2019	$9,457
Co-PI	NASA Innovative Advanced Concepts	Neutrino Detection from Space (PI Solomey)	2019-21	$500,000
Co-PI	NASA Space Grant Consortium	Celebrate Symposium (PI Schwartz)	2019	$12,580

*Advising: 2 Ph.D. (1 graduated, 1 current), 6 MS thesis (4 graduated, 2 current), 5 MS directed project (graduated)
*K-12: Astronautics mini-camp (2016), Space propulsion for Grade-3 class (2019), K-12 poster competition (2019)
*Developed an inter-disciplinary graduate certificate program on Space Science along with faculty from LAS

NAME: Zelalem Demissie

POSITION TITLE & INSTITUTION: Assistant Professor, Wichita State University

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Addis Ababa University	Ethiopia	Geology and Geophysics	BSc	2000
Addis Ababa University	Ethiopia	Geology and Geophysics (GIS and Remote Sensing)	MSc	2005
Kent State University	Ohio	Applied Geology		2011
Oklahoma State University	Oklahoma	Geology and Geophysics	PhD	2018

B. APPOINTMENTS

(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2019 to present	Assistant Professor of Environmental Geophysics, Wichita State University
Spring 2016	Geo-spatial Consultant of the World Bank, The World Bank Group
Summer 2014	Cartographic Technician Intern, Oklahoma State University
2012-2018	Research Assistant & Teaching Assistant, Oklahoma State University
2009-2010	Teaching Assistant, Kent State University
2005 -2009	Co-founder and General manager, Geo-Spatial Information Solutions Inc.
2001-2005	Project Geologist, National Mining, Inc.

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Produced a dashboard of data visualizations that chart the spread of COVID-19 in the state of Kansas. Unique among maps of this type, Dimissie's dashboard includes a time-series map animation. The dashboard provides information about the spread but also allows any WSU-related department to add charts of different kinds.

Other Significant Products, Whether or Not Related to the Proposed Project

- Produced a geo-spatial database for the road network infrastructure expansion of Ethiopia from 1998 to 2012 to show an economic impact on the commodities exchanges and influences on price fluctuations.

- Detailed spatial guide map of the capital City of Ethiopia, Addis Ababa; 100,000 copies were sold in one year. The map has been in high demand among tourists, diplomats, store-owners, tour operators and the general public since its publication, including the US embassy http://www.omnimap.com/catalog/int/ethiop.htm.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

- Demissie has designed undergraduate and graduate-level courses that are interrelated to geospatial data management, including Applied GIS (GEOL 690Z), Spatial SQL and SDE (GIS Database Management) (GEOL 692) and Python Scripting for GIS (GEOL 693) that were already approved in CIM in Fall 2019 and Spring 2020.
- Reviewing manuscripts related to geohazards for the Journal of African Earth Science.

NAME: Glyn M Rimmington

POSITION TITLE & INSTITUTION: Professor of Global Learning, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Queensland	St. Lucia, Queensland, Australia	Ecosystems Ecology	BSc Hons 1	1980
University of Queensland	St. Lucia, Queensland, Australia	Effects of Fluoride Air Pollution on Plant Growth and Development	PhD	1986

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
1980	Graduate Research Assistant, Agronomy Department, Faculty of Agriculture, University of Queensland, St Lucia, Queensland, Australia
1981-1984	Graduate Research Assistant, Botany Department, Faculty of Agriculture, University of Queensland, St Lucia, Queensland, Australia
1984 - 1986	Post-doctoral Research Fellow, Environmental & Civil Engineering Department, University of Melbourne, Melbourne, Victoria, Australia
1987 - 1989	Lecturer, Institute of Land & Food Resources, University of Melbourne, Melbourne, Victoria, Australia
1989 - 1994	Senior Lecturer, Institute of Land & Food Resources, University of Melbourne, Melbourne, Victoria, Australia
1995	Associate Professor & Director, Multimedia Education Unit, Center for the Study of Higher Education, Faculty of Education, University of Melbourne, Melbourne, Victoria, Australia
1996 - 2001	Associate Professor of Environmental Informatics, Institute of Land & Food Resources, University of Melbourne, Melbourne, Victoria, Australia,
2001 - 2002	Boeing Distinguished Professor of Global Learning, Dean's Office, College of Engineering
2002 - 2005	Boeing Distinguished Professor of Global Learning, AVPAR's Office, Academic Affairs
2006 - 2009	Boeing Distinguished Professor of Global Learning & Chair, Educational Leadership, College of Education
2009 - 2019	Distinguished Professor of Global Learning, Dean's Office, LAS
2019 -	Distinguished Professor of Global Learning, Geology Department, LAS

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Green, D. G. & Rimmington, G. M., Klomp, N. & Sedaden, S. (2020). Complexity in Landscape Ecology. 2nd Edition, Springer Landscape Series. Dordrecht: Springer. 317 pp

Rimmington, G. M. & Alagic, M. (2008). Third Place Learning: Reflective Inquiry into Intercultural and Global Cage Painting. Information Age Publishers Inc. 162 pp.

Rimmington, G.M. & Alagic, M. (2016). Corporate Social Responsibility: ThirdPlaceLearning for Absorbing Diverse Perspectives. In: K. Hansen & C. Seierstad (Eds.). Corporate Social Responsibility and Diversity. Berlin: Springer International Publishing. Chap. 16.

Zhu, L.H., Chen, Z.X., Wang, J.J., Ding, J.Z., Yu, Y.J., Li, J.S., Xiao, N.W., Jiang, L.H., Zheng, Y.R., Rimmington, G.M. (2014). Monitoring plant response to Phenanthrene using the red edge of canopy hyperspectral reflection. Marine Pollution Bulletin. DOI: 10.1016/j.marpolbul.2014.06.046

Zhu, L.H., Zhao, X.C., Lai, L.M., Wang, J.J., Jiang, L.H., Ding, J.Z., Liu, N.X., Yu, Y.J., Li, J.S., Xiao, N.W., Zheng, Y.R., & Rimmington, G.M. (2013). Soil TPH Concentration Estimation Using Vegetation Indices in an Oil Polluted Area of Eastern China. Public Library of Science One, 8(1), 1-12. E54028

Other Significant Products, Whether or Not Related to the Proposed Project

Zhu, L.H., Wang, J.J., Ding, J.Z., Yu, Y.S. Xiao, N.W., Jiang, L.H., Zheng, Y.R. & Rimmington, G.M. (2015). Effects of elevated soil total petroleum hydrocarbon concentration on the reed community after ten years of oil extraction and the predictive power of different biological indicators for the long-term risk assessments. Ecological Indicators. 48: 235-243.

Zheng, Y. R., Xie, Z. X., Rimmington, G. M., Yu, Y. J., Gao, Y., Zhou, G. S., An, P., Li, X. J., Tsujie, W. & Shimizu, H. (2010). Elevated CO2 accelerates net assimilation rate and enhances growth of dominant shrub species in a sand dune in central Inner Mongolia. Environmental and Experimental Botany. 68, 31-36.

Rimmington, G. M., and Alagic, M. (2007). From Modeling Foliage with L-systems to Digital Art. Proc. 10th Annual Bridges Conference. Bridges Donostia. Mathematics, Music, Art, Architecture, Culture. San Sebastian, Spain. July 24-27, Hertfordshire, UK, Tarquin Publications, pp. 269-276.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

5th International Conference on InterCultural Communication Competence, May 21st - 23rd, 2008, Wichita, Kansas and edited volume of selected conference papers (Alagic, Rimmington, Liu & Gibson, 2010).

Online Cage Painting Simulator (described in several journal and conference papers) for undergraduate and graduate classes and professional development workshops held in India, Mexico, Japan, Russia, Australia and Canada between 2005 and 2012.

L-systems Workshops in Bathurst, Australia, 1998; Banff, Canada 2007 - participants designed new L-systems of different biological organisms; and presentation in San Sebastian, Spain, 2007.

Simulation Modeling Workshops, Baoding, China 1994-1998, application of evolutionary algorithms to optimization of simulation models of cropping systems with participants from across China.

NAME: Chase M. Billingham

POSITION TITLE & INSTITUTION: Associate Professor of Sociology, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Northeastern University	Boston, MA, USA	Sociology	Ph.D.	2013
Northeastern University	Boston, MA, USA	Sociology	M.A.	2008
Tulane University	New Orleans, LA, USA	Sociology	B.A.	2006

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2019 - present	Associate Professor of Sociology, Wichita State University, Wichita, KS, USA
2013 - 2019	Assistant Professor of Sociology, Wichita State University, Wichita, KS, USA
2007 - 2013	Research Associate, Kitty and Michael Dukakis Center for Urban and Regional Policy, Northeastern University, Boston, MA, USA

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Billingham, Chase M. and Sean Sandefur. 2019. "The Conceptual Pliability of TIF and the Political Rhetoric of Environmental Remediation: Groundwater Pollution and Tax 'Decrement' Financing in Wichita." Chapter 14 (pp. 277-296) in Tax Increment Financing and Economic Development: Uses, Structures, and Impact (2nd Edition), edited by Craig L. Johnson and Kenneth A. Kriz. Albany, NY: State University of New York Press.

Billingham, Chase M. 2015. "The Broadening Conception of Gentrification: Recent Developments and Avenues for Future Inquiry in the Sociological Study of Urban Change." Michigan Sociological Review 29:75-102.

Pollack, Stephanie, Barry Bluestone, and Chase Billingham. 2010. Maintaining Diversity in America's Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change. Boston, MA: Dukakis Center for Urban and Regional Policy.

Other Significant Products, Whether or Not Related to the Proposed Project

Billingham, Chase M., Shelley McDonough Kimelberg, Sarah Faude, and Matthew O. Hunt. Forthcoming. "In Search of a Safe School: Racialized Perceptions of Security and the School Choice Process." The Sociological Quarterly.

Billingham, Chase M. and Shelley McDonough Kimelberg. 2018. "Identifying the Urban: Resident Perceptions of Community Character and Local Institutions in Eight Metropolitan Areas." City & Community 17:858-882.

Billingham, Chase M. and Matthew O. Hunt. 2016. "School Racial Composition and Parental Choice: New Evidence on the Preferences of White Parents in the United States." Sociology of Education 89:99-117.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

Collaboration across departments to produce research on groundwater pollution, remediation, and economic development policies with a graduate student from the Hugo Wall School of Public Affairs (see Billingham and Sandefur 2019).

Teaching social science statistics courses across university departments at Wichita State University.

Seven years of experience working in at Northeastern University's Dukakis Center, an interdisciplinary research center focused on urban social, economic, and political issues.

NAME: Terrance Maynard Figy

POSITION TITLE & INSTITUTION: Assistant Professor, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Wisconsin-Eau Claire	Eau Claire, WI	Physics and Math	BS	2000
University of Wisconsin-Madison	Madison, WI	Physics	PhD	2006
University of Durham	Durham, UK	Theoretical Particle Physics	Postdoc	2006-2009
European Organization for Nuclear Research	Geneva, CH	Theory	Postdoc	2009-2011
University of Manchester	Manchester, UK	High Energy Particle Physics	Postdoc	2011-2014

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2015-Present	Assistant Professor, Wichita State University, Wichita, KS

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

1. T. Chen, T. M. Figy and W. T. Giele, "A Projective Phase Space Generator for Hadronic Vector Boson Plus One Jet Production", arXiv:1907.03893 [hep-ph]
2. T. M. Figy and W. T. Giele, "A Forward Branching Phase Space Generator for Hadron colliders", JHEP 1810, 203 (2018)
3. F. Campanario, T. M. Figy, S. Pla¨tzer, M. Rauch, P. Schichtel and M. Sj¨odahl, "Stress testing the vector-boson-fusion approximation in multijet final states", Phys. Rev. D 98, no. 3, 033003 (2018)
4. F. Campanario, T. M. Figy, S. Platzer and M. Sjodahl, "Electroweak Higgs Boson Plus Three Jet Production at Next-to-Leading-Order QCD", Phys. Rev. Lett. 111, no. 21, 211802 (2013)
5. T. Figy, V. Hankele and D. Zeppenfeld,"Next-to-leading order QCD corrections to Higgs plus three jet production in vector-boson fusion", JHEP 0802, 076 (2008)

Other Significant Products, Whether or Not Related to the Proposed Project

1. K. Arnold, T. Figy, B. Jager and D. Zeppenfeld, "Next-to-leading order QCD corrections to Higgs boson production in association with a photon via weak-boson fusion at the LHC", JHEP 1008, 088 (2010)
2. K. Arnold et al., "VBFNLO: A Parton level Monte Carlo for processes with electroweak bosons", Comput. Phys. Commun. 180, 1661 (2009)
3. V. Hankele, G. Klamke, D. Zeppenfeld and T. Figy, "Anomalous Higgs boson couplings in vector boson fusion at the CERN LHC", Phys. Rev. D 74, 095001 (2006)

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

1. Contributed to the write up of reports for the High Luminosity/High Energy LHC Working Group and the LHC Higgs Cross Section Working Group.
2. Presented research through invited university seminars and conference talks.
3. Participated in the Summer Theory Visitor Program in 2017, 2018, and 2019 at Fermi National Accelerator Laboratory.
4. Developed Docker containers for high energy physics software tools in order to train graduate students in the usage of Monte Carlo simulation tools and high performance computing.
5. Promoted the usage of high performance computing as the Extreme Science and Engineering Discovery Environment (XSEDE) Campus Champion for Wichita State University.

NAME: Mara Alagic

POSITION TITLE & INSTITUTION: Professor and Graduate Coordinator, Wichita State University

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Belgrade	Yugoslavia	Mathematics	B. Sci.	1972
University of Belgrade	Yugoslavia	Mathematics	M. Sci.	1975
University of Belgrade	Yugoslavia	Mathematics	Ph. D.	1985

B. APPOINTMENTS

(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2018 – ongoing	Professor, School of Education: College of Applied Studies, Wichita State University
2009 - 2012	Assistant Dean, Graduate School, Wichita State University
2005 - 2018	Associate Professor School of Education: College of Applied Studies, Wichita State
1999 - 2005	Assistant Professor, Mathematics Education, Curriculum & Instruction Department, College of Education, Wichita State University
1993-1999	Instructor, Department of Mathematics and Statistics, LAS,Wichita State University
1991-1993	Visiting Assistant Professor Department of Mathematics and Statistics, University of Vermont, Burlington
1985-1991	Assistant Professor Department of Mathematics and Statistics, University of Sarajevo, Bosnia & Herzegovina

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Rimmington, G. M., & Alagic, M. (2016). Corporate Social Responsibility: ThirdPlaceLearning for Absorbing Diverse Perspectives. In Hansen, K., & Seierstad, C. (Eds.). Corporate Social Responsibility and Diversity Management: Theoretical Approaches and Best Practices (pp. 269-288). Springer International Publishing. (In the Series CSR, Sustainability, Ethics & Governance, Springer)

Flores, R., Koontz, E., Inan, F. A., & Alagic, M. (2015). Multiple representation instruction first versus traditional algorithmic instruction first: Impact in middle school mathematics classrooms. Educational Studies in Mathematics

Alagic, M., Orel, T. & Rimmington, G. (2017): Toward Dynamic Representations of ThirdPlaceLearning. Proceedings of the TKE 2016 - 12th International Conference on Terminology and Knowledge Engineering, June 2016 Copenhagen Business School, CBS http://openarchive.cbs.dk/handle/10398/9323 (Proceedings) https://dl.dropboxusercontent.com/u/27766628/TKE%202016%20present_ALAGIC.pdf (paper) http://openarchive.cbs.dk/handle/10398/9323 (Proceedings)

Orel, T., Alagic, M., & Rimmington, G. (2014). Concept System Analysis of the ThirdPlaceLearning Theory. In Terminology and Knowledge Engineering 2014, (pp. 10-p).

Other Significant Products, Whether or Not Related to the Proposed Project

Alagic, G. & Alagic, M. (2013). Collaborative mathematics learning in online environments. In Martinovic, D; Freiman, V. & Karadag, Z. (Eds.).Visual Mathematics and Cyberlearning Series: Mathematics Education in the Digital Era, Vol. 1, Springer.

M. Alagic, A. L. Nagata, & G. M. Rimmington (2009). Improving Intercultural Communication Competence. Journal of Intercultural Communication SIETAR Japan (12) pp. 39-55.

Alagic, M., & Palenz, D. (2006). Teachers explore linear and exponential growth: Spreadsheets as cognitive tools. Journal of Technology and Teacher Education (JTATE), 14(3), 633-649.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

1. Instructional co-designer and Graduate Coordinator – Master's of Education in Learning and Instructional Design Wichita State University, Wichita KS (2014 – ongoing)
2. Instructional co-designer and Coordinator of iSTEM Education Graduate Certificate Wichita State University, Wichita KS (2014 – ongoing)
3. Editor in Chief: Journal of Mathematics and the Arts, Taylor & Francis, UK (2017 – ongoing)
4. Alagic, M. (2015 – 2018). Teacher Inquiry into Math, Engineering, and Science Practices, Kansas Mathematics/Science Partnership Grants (MSP). Kansas Board of Regents. Evaluation Report for Year 1-3. [External Evaluator; PI Barbara Sponsel, Ph.D., Newman University, Wichita, KS]
5. American Mathematical Society (AMS) (1993 – ongoing)

NAME: Dr. Atul Rai

POSITION TITLE & INSTITUTION: Associate Professor and Dean's Fellow, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Indian Institute of Technology	Kanpur, India	Mechanical Engineering	B.Tech.	1981
Indian Institute of Management	Kolkata, India	Management	MBA	1983
New York University	New York, NY	Accounting (major) finance (minor)	Ph. D.	1996

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
198-1989	Various junior and middle management positions in corporate sector in India, primarily product management in heavy equipment (earthmoving/mining/construction) industry in India
1995-1996	Instructor, Stern School of Business, New York University, New York, NY.
1996-1996	Assistant Vice President (Research), TIMCO (a subsidiary of CitiBank); portfolio management of $1.6 billion fund.
1996-2003	Assistant Professor, Florida State University , Tallahassee, FL(2001-2002 on leave for appointment as Visiting Assistant Professor, Baruch College, City University of New York, New York, NY)
2003-2007	Assistant Professor, University of Alabama in Huntsville, Huntsville, AL
2007-2010	Assistant Professor and Larry Jones Fellow, Wichita State University, Wichita, KS
2010-current	Associate Professor and Dean's Fellow, Wichita, State University, Wichita, KS.

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Statistical analyses of financial and accounting data

Rai, A., & Kerstein, J. (2018). Reexamination of earnings management before and after the SOX: Evidence from SEC Staff Accounting Bulletins 99-100. Journal of Accounting and Public Policy.

Rai, A., & Tartaroglu, S. (2015). Relative option volume and market reaction to earnings surprises. Journal of Accounting Auditing and Finance, 30 (4), 431-460.

Rai, A., Nainar, K., & Tartaroglu, S. (2014). Market Reactions to Wells Notice: An Empirical Analysis. International Journal of Disclosure and Governance, 11, 177-193.

Rai, A. (2013). Measurement of efficiencies in airlines industry using data envelopment analysis. Investment Management and Financial Innovations, 10 (1), 38-45.

Pendley, J., & Rai, A. (2009). International Financial Reporting: An Examination of Current Practice. International Journal of Disclosure and Governance, 6 (2), 89-105.

Kerstein, J., & Rai , A. (2007). Intra-year shift in earnings distributions: Its implications for earnings management. Journal of Accounting and Economics, 44 (3), 399-419.

Other Significant Products, Whether or Not Related to the Proposed Project

Rai, A. and C. Sisneros (2018). Evaluating Pedagogy In Educating Business Majors: An Empirical Analysis of Teaching Accounting Without Debits and Credits. Accounting and Financial Control, 1 (1), 15-26, doi: http://dx.doi.org/10.21511/afc.02(1).2018.02.

Moffitt, J., & Rai, A. (2006). Information content of analysts' forecast in the presence of frequent special items. Journal of Business and Economic Perspectives, XXXII (1), 120-129.

Rai, A. (2005). Changes in risk characteristics of firms issuing hybrid securities. Accounting and Finance, 45 (4), 635-651.

Rai, A. (2003). Reconciliation of net income to cash flow using accounting equation. Journal of Accounting Educ

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

Collaborative work with colleagues working in the US universities as well as international universities.

NAME: Nathan W. Filbert

POSITION TITLE & INSTITUTION: Assistant Professor, Research and Instruction Librarian, University Libra

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
European Graduate School	Saas-Fee, Switzerland	Philosophy, Art, and Critical Thought	PhD (ABD)	2015 - present
Emporia State University	Emporia, Kansas	Library and Information Science	MLIS	2014
Calvin Theological Seminary	Grand Rapids, Michigan	Philosophical Theology	MTS	1996
Cairn University	Langhorne, Pennsylvania	Theology Music Composition	BS BA	1993 1993

B. APPOINTMENTS

(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2015 - present	Assistant Professor, Research & Instruction Services Librarian, Wichita State University, Wichita, Kansas
2018 - present	Assistant Professor, Graduate School, Liberal Arts & Sciences, Wichita State University, Wichita, Kansas
2015-2016	Graduate Teaching Assistant, European Graduate School, Saas-Fee, Switzerland
1994-1996	Graduate Teaching Assistant, Calvin College and Grand Valley State University, Grand Rapids Michigan
2000-2012	Assistant Manager, Barnes and Noble Booksellers, Wichita, Kansas

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Filbert, N. Altered to Bits: Literacy and the Digital. Journal of Academic Librarianship, under review, 2020.

Filbert, N. Framing the framework: the rigorous responsibilities of library and information science. Reference & User Services Quarterly (RUSQ), Spring 2016, Vol. 55, Issue 3, p.199-203.

Filbert, N. W. "Infiltration of Information Literacy Instruction in the Life Sciences" AAAS National Conference Presentation, Washington DC, February 14, 2019.

Bowen, A. & Filbert, N.W. "Faculty-Librarian Collaboration: Resources & Services." Presented at WSU Academic Resource Conference. Wichita State University, Wichita, KS. August 15, 2019.

Thesis, Emporia State University, Emporia, Kansas
• Comparative research on the concept of "information" and human literacy through various media and technologies across history

Other Significant Products, Whether or Not Related to the Proposed Project

Workshop Presentations, "Researching the Digital World," "Am I Digitally Literate," "Being Digitally Literate," "What is Digital Literacy" University Libraries Digital Literacy Workshop Series, September, 2016, February 2017, September 2017, February 2018, September 2018.

Workshop Presentations, "Multi-Disciplinary Research Methods," "Conducting Literature Reviews," "Presenting Your Research," University Libraries Savvy Researcher Workshop Series, 2016-2018.

Filbert, N. and Matt Upson (Oklahoma State University)
Making Comics, Making Meaning – conference presentation at Making Information Meaningful: Using Information Literacy to Teach Critical Thinking. Tulsa Community College, Tulsa, OK. October 22-23, 2015.

Dissertation, European Graduate School, Saas-Fee, Switzerland

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

Faculty Librarian appointment involves co-teaching, resource acquisition and access, curriculum design, instruction, and research reference and assistance across University Colleges. It is synergistic in nature, as collaboration must occur across colleges, departments, disciplines, and research.
Serve currently as instructional librarian and research services across the following University departments: Philosophy, Religion, Biological Sciences, Chemistry, Physics, Mathematics, Statistics, and The Dorothy & Bill Cohen Honors College, Asst Professor in LAS Graduate School. Previously included History, Sociology, Political Science, the College of Applied Sciences, Human Performance Studies, and Communication (2015-2017), having taught in 283 classes, seminars, and institutes throughout these disciplinary areas.

NAME: Lacy Meghann Kuhlmann

POSITION TITLE & INSTITUTION: Instruction and Research Services Librarian and Assistant Professor

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
San Jose State University	San Jose, CA	Library and Information Science	Master of Library and Information Science	2013
California State University, CA	Sacramento, CA	English	Bachelor of Arts, English	2011

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2015-present	Instruction and Research Services Librarian and Assistant Professor; Wichita State University; Wichita, KS
2014-2015	Adjunct Librarian; California State University Sacramento; Sacramento, CA
2013	Research Assistant; San Jose State University Research Foundation; San Jose, CA

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Abdinnour, S., & Kuhlmann, M. (2016). A simple software prototype to enhance academic and industry research collaboration. Journal of Higher Education Theory and Practice, 16(6), 106.

Other Significant Products, Whether or Not Related to the Proposed Project

Kuhlmann, M., & Walker, L. (2019). Superheroes in the stacks: Halloween ComicFest and Wichita State University. Journal of Library Administration, 59(3), 298-313.

Agosto, D. E., Bell, J. P., Bernier, A., & Kuhlmann, M. (2015). “This is our library, and it’s a pretty cool place”: A user-centered study of public library YA spaces. Public Library Quarterly, 34(1), 23-43.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

Faculty Librarian appointment involves co-teaching, resource acquisition and access, curriculum design, instruction, and research reference assistance across University Colleges. It is synergistic in nature, as collaboration must occur across colleges, departments, disciplines, and research. I currently serve as instruction and research services librarian to: Barton School of Business, School of Social Work, Hugo Wall School of Public Affairs, and the Department of English.

NAME: Aaron Bowen

POSITION TITLE & INSTITUTION: Instruction and Research Services Librarian, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Washington	Seattle, WA	Library and Information Science (UW Information School)	Master of Library and Information Science	2006
University of Washington	Seattle, WA	International Studies (UW Henry M. Jackson School of International Studies)	Master of Arts in International Studies	2006

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
1996 - 2000	Cataloging Assistant, Experience Music Project (now Museum of Pop Culture), Seattle, WA, US
2004 - 2006	Information Specialist, University of Washington, Center for Studies in Demography and Ecology, Seattle, WA, US
2007 - 2015	Reference/Subject Librarian, California State University Chico, Meriam Library, Chico, CA, US
2015 - present	Instruction and Research Services Librarian, Wichita State University, WSU University Libraries, Wichita, KS, US

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Chesser, A., Keene Woods, N., Bowen, A., Vargas, I.L., and Hawley, S. Mental health literacy and women: A systematic review. Health Care for Women International. Under Review 12/18/2019.

Other Significant Products, Whether or Not Related to the Proposed Project

Bowen, A. The visual effect: A literature review of visual design principles as they apply to academic library websites. Internet Reference Services Quarterly. Forthcoming. https://doi.org/10.1080/10875301.2019.1702133.

Bowen, A., Ellis, J., and Chaparro, B. (2018). Long nav or short nav?: Student responses to two different navigational interface designs in LibGuides Version 2. Journal of Academic Librarianship, 44(3): 391-403. DOI: 10.1016/j.acalib.2018.03.002

Bowen, A. (2014). LibGuides and Web-based library guides in comparison: Is there a pedagogical advantage? Journal of Web Librarianship, 8(2): 1-25. DOI: 10.1080/19322909.2014.903709

Bowen, A. (2012). A LibGuides presence in a Blackboard environment. Reference Services Review, 40(3): 449 – 468. DOI: 10.1108/00907321211254698

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

NAME: Maria Sclafani

POSITION TITLE & INSTITUTION: Coordinator of Library Instructional Services, Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Smith College	Northampton, MA	English major, Latin minor	B.A.	2008
University of Colorado Boulder	Boulder, CO	English	M.A.	2011
University of Illinois Urbana-Champaign	Urbana-Champaign, IL	Library and Information Science	M.L.I.S.	2019

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2019-Present	Coordinator of Library Instructional Services and Assistant Professor, Wichita State University, Wichita, KS
2017-2019	Graduate Assistant-Main Library, University of Illinois Urbana-Champaign, Urbana-Champaign, IL
2018	Graduate Hourly-Social Sciences, Health, and Education Library, University of Illinois Urbana-Champaign, Urbana-Champaign, IL
2017-2018	Graduate Hourly-Library Communications, University of Illinois Urbana-Champaign, Urbana-Champaign, IL
2012-2017	Lecturer-Program for Writing and Rhetoric, University of Colorado Boulder, Boulder, CO
2014-2015	Instructor-Upward Bound College Preparation Program, University of Colorado Boulder, Boulder, CO
2011-2012	Writing Consultant-University Writing Center, University of Colorado Boulder, Boulder, CO
2010-2012	Learning Facilitator and Subject Tutor-Athletic Department, University of Colorado Boulder, Boulder, CO
2009-2010	Graduate Teaching Assistant-Department of English, University of Colorado Boulder, Boulder, CO

C. PRODUCTS
(see PAPPG Chapter II.C.2.f.(i)(c))
Products Most Closely Related to the Proposed Project

Other Significant Products, Whether or Not Related to the Proposed Project

Afnan, T., Huang, H.Y., Sclafani, M., Bashir, M. (2019). Putting a price on social movements: A case study of #metoo on Instagram. Proceedings of the Association for Information Science and Technology 56(1): 1-9. https://doi.org/10.1002/pra2.2

D. SYNERGISTIC ACTIVITIES
(see PAPPG Chapter II.C.2.f.(i)(d))

NAME: Ethan Lindsay

POSITION TITLE & INSTITUTION: Humanities and Social Sciences Librarian and Assistant Professor

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
UNC-Greensboro	Greensboro, NC	Library and Information Studies	MLIS	2017
Princeton University	Princeton, NJ	Religious Studies	PhD	2012
Princeton University	Princeton, NJ	Religious Studies	MA	2007
Indiana University	Bloomington, IN	Religious Studies	MA	2003
Wake Forest University	Winston-Salem, NC	Religious Studies	BA	2001

B. APPOINTMENTS

(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2020 - present	Humanities and Social Sciences Librarian and Assistant Professor, Wichita State University, Wichita, Kansas
2018-2019	Adjunct Librarian, Appalachian State University, Boone, North Carolina
2015-2017	Graduate Research Assistant, Department of Library and Information Studies, UNC-Greensboro, Greensboro, North Carolina
Summer 2016	Atkins Fellow in Collection Development, UNC-Charlotte Atkins Library

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Lindsay, E. "Rudolph Matz: A Life in Music." Digital exhibition created for Special Collections and University Archives, UNC-Greensboro, Spring 2017

Lindsay, E. "Collection Management in Bioinformatics: A Case Study about Building Online Resources." Paper and presentation, UNC-Charlotte Atkins Library, August 2016

Other Significant Products, Whether or Not Related to the Proposed Project

Lindsay, E. Biographies from The Accounts of Those From Mount Koya Who Have Attained Birth in a Pure Land. A translation and introduction in Pure Lands in Asian Texts and Contexts: An Anthology. University of Hawaii Press.

Lindsay, E. Pilgrimage to the Sacred Traces of Koyasan: Place and Devotion in Late Heian Japan. Princeton University PhD dissertation, 2012.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

Faculty Librarian appointment involves co-teaching, resource acquisition and access, curriculum design, instruction, and research reference and assistance across University Colleges. It is synergistic in nature, as collaboration must occur across colleges, departments, disciplines, and research.
Serve currently as instructional and research services librarian across the following university departments: Sociology, History, Political Science, Religion, and Criminal Justice.
In my previous position at Appalachian State University, I provided research and instruction services to students in Engineering, Criminal Justice, Political Science, History, English, and several other fields.

NAME: Matveyeva, Susan J.

POSITION TITLE & INSTITUTION: Wichita State University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Odessa State Conservatory	Odessa, Ukraine	Theory and History of Music	B. Musicology	1970
Russian Academy of Science Institute of Philosophy	Moscow, Russia	Philosophy of Culture	Ph.D.	1985
Wayne State University	Detroit, MI	Library and Information Science	MLIS	2001

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2009-Present	Associate Professor and Catalog & Institutional Repository Librarian; Wichita State University; Wichita, KS.
2002 - 2008	Assistant Professor and Catalog & Institutional Repository Librarian; Wichita State University; Wichita, KS.
2001 - 2002	Research Library Intern, UAW, Detroit, MI
2000 - 2001	Library Supervisor, Center for Creative Studies, College of Art and Design, Detroit, MI
1996- 1999	Researcher, Michigan State University, Department of Sociology, E. Lansing, MI
1992-1995	Senior Researcher, Russian Independent Institute for Social and Nationalities Problems, Moscow, Russia
1981- 1994	Researcher, Russian Academy of Science Institute of Philosophy, Moscow, Russia
1971-1981	Editor, in the University Publishing House, Gnesin University of Music, Moscow, Russia

C. PRODUCTS
(see PAPPG Chapter II.C.2.f.(i)(c))
Products Most Closely Related to the Proposed Project

Other Significant Products, Whether or Not Related to the Proposed Project

1. Matveyeva, Susan J., Shlapentokh, V.E. Fears in Russia, Novosibirsk, Sib.Khr., 2000 - 187 pages. (in Russian)
2. Matveyeva, Susan J. (1997) National problems in Russia: current political discussions. Social Sciences Today, No.1, p.52-62 (In Russian)
3. Zdravomyslov, A.G., Matveyeva, Susan J., Ethnic Conflicts in Russia and the New Independent States. Moscow: Institute Ethnology and Anthropology, Russian Academy of Sciences. Researches in Applied Ethnology, N.85.1996 (in Russian)
4. Matveyeva, Susan J. Is Nation-state possible in Russia? (1996.) Polis, Political Studies, No.1, p.154-162.
5. Matveyeva, Susan J., ed. Modernization in Russia and conflict of values. Moscow: Institute of Philosophy, Russian Academy of Sciences, 1984. -250 pages. (in Russian)

D. SYNERGISTIC ACTIVITIES
(see PAPPG Chapter II.C.2.f.(i)(d))

- Development and management of the WSU research database SOAR: Shocker Open Access Repository from its beginning in 2006 to present as the scholarly communication and digital archive system of dissemination and preservation of the University students, faculty, researchers, and inventors intellectual output.
- Development and management of the Open Journal Systems database, hosted by the University Libraries to disseminate locally published electronic journals

Doina Caragea

Professor, Department of Computer Science, Kansas State University

(a) Professional Preparation

University of Bucharest	Bucharest, Romania	Computer Science	B.S., 1996
University of Bucharest	Bucharest, Romania	Computer Science	M.S., 1997
Iowa State University	Ames, IA, USA	Computer Science	Ph.D., 2004
Iowa State University	Ames, IA, USA	Computer Science	Postdoc, 2004-2006

(b) Appointments

Professor, Computer Science	Kansas State University	2018 - present
Associate Director, Bioinformatics Center	Kansas State University	2007- present
Associate Professor, Computer Science	Kansas State University	2012 - 2018
Assistant Professor, Computer Science	Kansas State University	2006 - 2012
IBM Graduate Research Fellow	Iowa State University	2002 - 2004
Graduate Research Assistant, Computer Science	Iowa State University	1998 - 2002

(c) Products - Publications

(i) Five products most closely related to the proposed project

1. Jishnu Ray Chowdhury, Cornelia Caragea, **Doina Caragea** (2020). On Identifying Hashtags in Disaster Twitter Data. In: Proceedings of Thirty-Fourth Conference on Artificial Intelligence (AAAI'20), New York, NY, USA. In press.
2. Xukun Li, **Doina Caragea**, Huaiyu Zhang, Muhammad Imran (2019). Localizing and quantifying infrastructure damage using class activation mapping approaches. Social Network Analysis and Mining, 9(1):44.
3. Xukun Li, **Doina Caragea**, Cornelia Caragea, and Muhammad Imran, Ferda Ofli (2019). Identifying Disaster Damage Images Using a Domain Adaptation Approach. In: Proceedings of the 16th International Conference on Information Systems for Crisis Response and Management (ISCRAM), Valencia, Spain. *Best Insights Paper Award.*
4. Jishnu Ray Chowdhury, Cornelia Caragea, **Doina Caragea** (2019). Keyphrase Extraction from Disaster-related Tweets. In: Proceedings of the Web Conference 2019 (WWW'19), Ling Liu and Ryen White (Eds.). ACM, New York, NY, USA, pp. 1555-1566.
5. HongMin Li, **Doina Caragea**, Cornelia Caragea, and Nic Herndon (2018). Disaster Response Aided by Tweet Classification with a Domain Adaptation Approach. In: *Journal of Contingencies and Crisis Management (JCCM)*, 26 (1), pp. 16-27, Wiley Online Library.

(ii) Five other significant products

1. Reza Mazloom, Hongmin Li, **Doina Caragea**, Cornelia Caragea and Muhammad Imran (2019). A Hybrid Domain Adaptation Approach for Identifying Crisis-Relevant Tweets. In the International Journal of Information Systems for Crisis Response and Management (IJISCRAM), volume 11, issue 2.
2. HongMin Li, Oleksandra Sopova, **Doina Caragea** and Cornelia Caragea (2019). Domain Adaptation for Crisis Data Using Correlation Alignment and Self-Training. International Journal of Information Systems for Crisis Response and Management (IJISCRAM), 10(4), 1-20.

3. Venkata K. Neppalli, Cornelia Caragea and **Doina Caragea** (2018). Deep Neural Networks versus Naive Bayes Classifiers for Identifying Informative Tweets during Disasters. In: *Proceedings of the 15th Annual Conference for Information Systems for Crisis Response and Management (ISCRAM)*, Rochester, NY.
4. Xukun Li, Huaiyu Zhang, **Doina Caragea** and Muhammad Imran (2018). Localizing and Quantifying Damage in Social Media Images. In: *Proceedings of 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, Barcelona, Spain, pp. 194-201.
5. **Doina Caragea** and Xinming Ou (2017). Big Data Analytics for Mobile App Security. In: Big Data Data Analytics in Cybersecurity (Data Analytics Applications) 1st Edition, Editors Onur Savas and Julia Deng.

(d) Synergistic Activities

1. *Under-represented groups mentor:* Between Fall 2014 and Spring 2019, Caragea was the faculty advisor for the ACM-W local chapter, which had approximately 120 members from Computer Science and related areas. Currently, she is the faculty advisor of the newly created Diversity in Computing club. Activities of the club are aimed at encouraging diversity and inclusion, and also at recruiting and retaining underrepresented minority students in Computer Science and Engineering. Such activities include: visits to local high schools, mentorship of freshman students, panels on diversity, career options, graduate school, participation in the engineering open house. Regular activities include informal weekly lunches, movie and game nights, and are meant to bring minority students and their friends together, and to create a sense of community, that will help attract and retain more minority students to Computer Science and related areas.
2. *Undergraduate student mentor:* Caragea has mentored several students on research projects in recent years, including a female student in the Distributed Research Experiences for Undergraduates (DREU) program (funded by CRA-W) in 2014, several underrepresented students in the KSU Developing Scholars Program (DSP), student who received the Diana Nathan Undergraduate Research Experience Award, and several undergraduate students who received the KSU Engineering Fellowship.
3. *Committee member:* Caragea has served as a co-chair for "Scholarly Big Data: Challenges and Ideas," at AAAI 2016, 2015, and program committee member for conferences such as NAACL, ISBRA, ISCRAM, COLING, BIBM, HI-BI-BI, KEOD, etc.
4. *Reviewer*: Caragea has reviewed articles for many journals, including Data Mining and Knowledge Discovery (DMKD); Transactions on Knowledge and Data Engineering (TKDE); IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB); IEEE Intelligent Systems; International Journal of Data Mining and Bioinformatics (IJDMB), Journal of Contingencies and Crisis Management (JCCM), Plos One, SpringerPlus, etc.
5. *Recent invited talks:* Caragea has given invited talks related to her research on "Collecting, Processing and Analyzing Crisis Data to Enhance Situational Awareness" for several groups and institutions including the 2016 Annual Meeting of the Statistical Society of Canada (June 2016), the Kansas City Machine Learning Group's monthly meeting (February 2017), Workshop on Using Aerial and Social Media Images for Humanitarian Aid, Qatar Computing Research Institute (June 2018), NSF-DOE Center for Ultra-wide-area Resilient Electrical Energy Transmission Networks (CURENT), University of Tennessee (October 2018), ISU's Comp Sci 50th Anniversary, Iowa State University (September 2019).

WSU OFFICE OF RESEARCH PROPOSAL ROUTING FORM

Prop # 200702

GDS: JEH

MAC USERS: Please fill complete using the latest version of Adobe Reader

FINAL proposals are due a MINIMUM of 3 days prior to the Agency Deadline

Paper submissions which include cost share and/or waived indirects require additional processing time.

Principal Investigator (PI): Dukka KC

Agency Deadline: 06/08/20

Sponsor/Agency: State of Kansas (Internal)

Solicitation #: Pres Conv Sci Initatives

Project Title: Data-enabled prediction and assessment of community resilience for disaster

Period From: 07/01/20 To: 06/30/23

	YEAR ONE	TOTAL PERIOD
Direct Costs:	$100,000.00	$300,000.00
Indirect Costs	$0.00	$0.00
Total Costs	$100,000.00	$300,000.00
Cost Share:	$0.00	$0.00

PI's Effort (Total Project Person Months): See below

Course Release? No Overload? No

Research Type: Applied

Indirect (F&A) Rate (MTDC):

○ Organized Research 48%	○ Off Campus 26%
○ Instruction 50%	○ Commercial 63.61%
○ Other Sponsored Activities 30%	

If Sponsor Limits F&A, what rate is allowed?

Rate applied to this proposal (if not listed above) 0%

Budget is Lab Rate ONLY ○ Yes ◉ No

Includes Subreceipients ○ Yes ◉ No

Fundamental Research ◉ Yes ○ No

Research where the results are ordinarily published and shared broadly within the research community, and for which the researcher has not accepted restrictions for proprietary or national security reasons.

COMPLIANCE REVIEW: To be completed by the PI - MUST answer Yes or No to ALL

○ Yes	◉ No	Human Subjects	○ Yes	◉ No	Biological Materials	○ Yes	◉ No	Infectious Agents
○ Yes	◉ No	Hazardous Chemicals/Waste	○ Yes	◉ No	Clinical Trials	○ Yes	◉ No	Proprietary Information
○ Yes	◉ No	Animals	○ Yes	◉ No	Medical Devices/Drugs	○ Yes	◉ No	Foreign Nationals
○ Yes	◉ No	Radioactive Material	○ Yes	◉ No	Recombinant DNA or RNAi	○ Yes	◉ No	Foreign Travel/Shipping
○ Yes	◉ No	HIPPA/PHI*	○ Yes	◉ No	ITAR/CUI*	○ Yes	◉ No	Int'l Collaborations

Does this project pose a conflict of interest for you or any anticipated project member? ○ Yes ◉ No

Have you or any anticipated project member been debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from transactions by a federal department or agency? ○ Yes ◉ No

Are you or any anticipated project member currently delinquent on any federal debt? (i.e. taxes, student loans, etc.) ○ Yes ◉ No

Does this project require facilities that are not currently allocated/available to you? ○ Yes ◉ No

WSU Department/College/Center Responsible for Matching Funds/Cost Share	Amount

NOTES/COMMENTS:

The PI level of effort policy is waived for this opportunity.

*__Definitions:__ **HIPAA/PHI** - Health Insurance Portability and Accountability Act/Personal Health Information; **ITAR/CUI** - International Traffic in Arms Regulations/Controlled Unclassified Information

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Name	Role	Dept/College/Center	% of Project
Dukka KC	PI		
SEE PG 8 ATTACHMENT FOR PROJECT ALLOCATION			

Total Project Allocation **MUST** equal **100**

ACKNOWLEDGMENTS AND CERTIFICATIONS:

As the Principal Investigator, I acknowledge that I have reviewed and considered all terms and conditions (including those that must be accessed electronically), and I understand that said terms and conditions are/may be applicable to any and all work performed should the application be successful. My signature indicates my knowledge of the terms and conditions and my willingness/ability to comply therewith. With respect to any invention, discovery, or copyrightable material produced in the course of activities encompassed by this project, I agree that my rights and those of any Co-Investigator(s) working on this project shall be governed by the University policies relating to research, patents and copyrights as described in the WSU Faculty Handbook, and by the patent policy of the Kansas Board of Regents; and I have read and understand the lobbying restrictions and Responsible Conduct of Research requirements for **FEDERAL** grants, contracts and cooperative agreements attached hereto as page 3.

As the Principal Investigator, I hereby certify that: 1) the information submitted within this application is true, complete and accurate to the best of my knowledge; and 2) any false, fictitious or fraudulent statements or claims may subject me personally to criminal, civil or administrative penalties; and 3) I agree to accept responsibility for the scientific conduct of this project and provide the required progress reports if a grant is awarded as a result of this application.

FORM WILL LOCK ONCE SIGNED BY PI - ENSURE YOU HAVE READ AND COMPLETED ALL PRIOR SECTIONS

PI Signature: DocuSigned by: Dukka kC A247B59C4B974DC... Date: 6/5/2020

Agreement of project involvement and acknowledgements and certifications of Co-Principal Investigators (as applicable)

Co-PI DocuSigned by: Ajita Rattani 3CD567A63BCD43C...

Co-PI DocuSigned by: kaushik Sinha 7F0929B2DF7C4A8...

Co-PI DocuSigned by: Rajiv Bagai 33971E1FBE55421...

Co-PI DocuSigned by: AFF5333BBDB4476...

The validity of the proposed activity and commitment of resources (as noted) are hereby authorized.

DocuSigned by: 98B41F975DE3474...	6/6/2020	DocuSigned by: Janet Twomey B77B27AAB46C459...	6/8/2020
PI Chair/Center Director	**Date**	**PI Dean/Vice President**	**Date**
DocuSigned by: Leonard Scott Miller A475F8C2FFC5485...	6/8/2020		
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
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DocuSigned by: Karen Davis ABC3018BC2E74DB...	6/8/2020		
Director for Pre-Award / NIAR Pre-Award	**Date**	**Provost or Sr VP of Ind & Defense Programs** *Required for proposals with waived indirects and/or cost share*	**Date**

Prop # 200702 GDS: JEH

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PI Signature: DocuSigned by: Dukka KC A247B59C4B974DC... Date: 6/5/2020

Agreement of project involvement and acknowledgements and certifications of Co-Principal Investigators (as applicable)

Co-PI DocuSigned by: Belalem Demissie 75EB1F35B6404E1...

Co-PI DocuSigned by: Kyra Zimmington 80FC1C03E7CB453...

Co-PI DocuSigned by: Chase Billingham 20F4C0CAC9C1415...

Co-PI

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DocuSigned by: 98B41F975DE3474...	6/6/2020	DocuSigned by: Janet Twomey B77B27AAB46C459...	6/8/2020
PI Chair/Center Director	**Date**	**PI Dean/Vice President**	**Date**
DocuSigned by: William Parcell A0BF23ECF1E047F...	6/8/2020	DocuSigned by: Jodie Hertzog 5DA3555D8A22405...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: David Eichhorn FCA4B7DC1351439...	6/8/2020		
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
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DocuSigned by: Karen Davis ABC3018BC2E74DB...	6/8/2020		
Director for Pre-Award / NIAR Pre-Award	**Date**	**Provost or Sr VP of Ind & Defense Programs** *Required for proposals with waived indirects and/or cost share*	**Date**

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Co-PI DocuSigned by: Terrance Figy A6D496CE3C954D9... **Co-PI** DocuSigned by: Mara Mlagic 96C4CC68B2CE4AD...

Co-PI DocuSigned by: C7AE8314BD7D43E... **Co-PI**

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DocuSigned by: 98B41F975DE3474...	6/6/2020	DocuSigned by: Janet Twomey B77B27AAB46C459...	6/8/2020
PI Chair/Center Director	**Date**	**PI Dean/Vice President**	**Date**
DocuSigned by: Zigi Sun 636504993B0445E...	6/8/2020	DocuSigned by: Jody Fiorini 8CCE902228554B2...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: Jeffrey Bryant 837E96A6D0F3459...	6/8/2020	DocuSigned by: Shirley Lefever BB0C12A9C8F04DB...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: David Eichhorn FCA4B7DC1351439...	6/8/2020	DocuSigned by: Larisa Genin E734A8CC3D11404...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: Karen Davis ABC3018BC2E74DB...	6/8/2020		
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Co-PI DocuSigned by: AB1CFEBA0E99475... **Co-PI** DocuSigned by: Meghann Lubbmann C033704F32284FC...

Co-PI DocuSigned by: Aaron Bowen 8788E0B0B8F8478... **Co-PI** DocuSigned by: Maria Sclafani 67264FAA5439487...

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DocuSigned by: Dr Ceg 98B41F975DE3474...	6/6/2020	DocuSigned by: Janet Twomey B77B27AAB46C459...	6/8/2020
PI Chair/Center Director	**Date**	**PI Dean/Vice President**	**Date**
DocuSigned by: Ginger H Williams B4D263B0005F4C6...	6/8/2020	DocuSigned by: Nancy Deyoe E9C6F4C8EF11490...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: kathy A. Downes E3CCDF9D53974EF...	6/8/2020		
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
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DocuSigned by: Karen Davis ABC3018BC2E74DB...	6/8/2020		
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PI Signature: DocuSigned by: Dukka KC A247B59C4B974DC... Date: 6/5/2020

Agreement of project involvement and acknowledgements and certifications of Co-Principal Investigators (as applicable)

Co-PI DocuSigned by: Ethan Lindsay 560D958B0A4048D... **Co-PI** DocuSigned by: Susan Mathesena A9FFF47F109845F...

Co-PI **Co-PI**

The validity of the proposed activity and commitment of resources (as noted) are hereby authorized.

DocuSigned by: 98B41F975DE3474...	6/6/2020	DocuSigned by: Janet Twomey B77B27AAB46C459...	6/8/2020
PI Chair/Center Director	**Date**	**PI Dean/Vice President**	**Date**
DocuSigned by: Ginger H Williams B4D263B0005F4C6...	6/8/2020	DocuSigned by: Nancy Deyoe E9C6F4C8EF11490...	6/8/2020
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: Kathy A. Downes E3CCDF9D53974EF...	6/8/2020		
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
Additional Endorser / Co-PI Chair/Dean	**Date**	**Additional Endorser / Co-PI Chair/Dean**	**Date**
DocuSigned by: Karen Davis ABC3018BC2E74DB...	6/8/2020		
Director for Pre-Award / NIAR Pre-Award	**Date**	**Provost or Sr VP of Ind & Defense Programs** ***Required for proposals with waived indirects and/or cost share***	**Date**

Prop # 200702 GDS: JEH

CERTIFICATION REGARDING LOBBYING

The applicant certifies, to the best of his or her knowledge and belief , that: (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the applicant, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan or cooperative agreement. (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the applicant shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. (3) The applicant shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

RESPONSIBLE CONDUCT OF RESEARCH (RCR)

RCR training is a funding requirement for the National Science Foundation (NSF), the National Institutes of Health (NIH) and the USDA National Institute of Food and Agriculture (NIFA). Researchers applying for, and receiving, support from NSF, NIH or NIFA should be familiar with each agency's requirements with regards to RCR and be prepared to provide documentation of appropriate training. While RCR training should be an ongoing component of any research program, at a minimum, personnel on projects with a research component will need to register and complete the "Externally Funded Researchers" RCR course through the Collaborative Institutional Training Initiative (CITI) during the first 90 days of receiving salary support.

Date Rec'd by RTT

Prop # 200702

GDS: JEH

Routing Form Attachment

PROJECT ALLOCATION

Name	Role	Department/College/Center	% of Project
Dukka KC	PI	ENG / EECS	15
Ajita Rattani	Co-PI	ENG / EECS	4
Kaushik Sinha	Co-PI	ENG / EECS	3
Rajiv Bagai	Co-PI	ENG / EECS	4
Atri Dutta	Co-PI	ENG / Aerospace	5
Zelalem Demissie	Co-PI	LAS / Geology	9
Glyn Rimmington	Co-PI	LAS / Geology	10
Chase Billingham	Co-PI	LAS / Sociology	9
Chuck Koeber	Co-PI	LAS / Sociology	4
Terrance Figy	Co-PI	LAS / Physics	3
Mara Alagic	Co-PI	ED / CAS	10
Atul Rai	Co-PI	BUS / Accounting	9
Nathan Filbert	Co-PI	University Libraries	5
Meghann Kuhlmann	Co-PI	University Libraries	2
Aaron Bowen	Co-PI	University Libraries	2
Maria Sclafani	Co-PI	University Libraries	2
Ethan Lindsay	Co-PI	University Libraries	2
Susan Matveyeva	Co-PI	University Libraries	2
Total			**100**