Reflections on Continuing Growth

For my personal and professional growth, I take every opportunity to attend teaching and research related workshops relevant to my field. In the past year, I attended a Statistics workshop related to my interest in machine learning (workshop title: Bayesian Decision-making and Applications; May 9-10, 2019, Clarkson University). I also attended 5-days of the Sensors and Data Analytics workshop which was related to my interests in data analytics and visualization (Clarkson University; Aug 5-9, 2019). I attended the ACM-W NYCWIC conference (Lake George, NY; April 12-13, 2019) where our students got the best poster award.

Recently, I attended a Center for Creative Instruction (CCI) Winter workshop in SUNY Potsdam (Jan 22, 2020), where I learnt about powerful online tools that could be useful for me and my students when our course is interrupted by bad-weather. I expect to use some of these tools this semester, if needed.

In the near future, I expect to continue attending workshops, seminars, and conferences to both present my work and to learn about advances in the field. In particular, I'm looking forward to being an active participant in teaching and research workshops and meetings on campus, including relevant conferences hosted by the Associated Colleges of the St. Lawrence Valley.

Reflections on Scholarship

My research interests are in the fields of Big Data, Machine Learning, and Data Analytics. As is often noted, Data is the new oil – while mining data can be economically valuable, this resource must be handled carefully. Using machine learning and advanced data analytics, we can extract information and intelligence from the vast amount of data being generated. However, care must be taken in how we build and use our models. If these models are going to play an important role in our criminal justice system, healthcare industry, and in maintenance of public safety, it is critical that we have a full understanding of the performance characteristics of these models. In particular, my research focus is on understanding the connection between the source of data and the quality of models that they generate. To obtain large data sets, we often integrate measurements made over long time periods and in different geographical domains. As we broaden the spatio-temporal origin of data, how does that impact the quality of the models that we build? This is the primary question that I'm trying to address in my research.

One of my current related research projects uses a high-resolution, rich air quality data set from a dense sensor network in Chicago. Using this data set, we are building models to relate air quality to land use parameters such as traffic, building density, etc. We are then testing to see if the accuracy of models for predicting air quality over a selected time period varies with the size of the data used for model generation. We will use this model to then predict air quality in different cities and conduct tests to determine how to improve its robustness for wide spatial-scale application. This research is important as it will allow us to clearly establish the global applicability of big data models built with local data sets.

These research activities require collaboration with scientists across fields and universities. I have fortunately been invited to be part of a large team at Clarkson University to work together on this Big data problem. This team consisting of faculty from Mechanical engineering, Statistics, and Biology along with me and several PhD students and undergraduates meets weekly to discuss all aspects of the project. In this team, my role is to lead all aspects of data, including data access, storage, and processing. This work has been on-going for 1 year and has resulted in two presentations in national and local conferences, with another presentation just accepted for an international conference (Air Sensors International Conference) in May.

Last year, I published a paper, entitled: "Understanding public response to air quality using tweet analysis" was published in Big Data and Society Journal. This is the third paper that I have published since joining SUNY Potsdam. In addition, related work was also presented at the American Association for Aerosol Research Conference in October 2019 as a prestigious platform presentation.

I'm also keen on disseminating my research knowledge in other forms such as workshops and seminars. In August 2019, I co-organized a 5-day international workshop on Sensors and Data Analytics in Clarkson University. I was responsible for training the participants on the usage of practical data analytics tools. This involved multi-day instruction in programming, simple data analytics, and usage of advanced machine learning algorithms. The conference was attended by faculty, researchers, and students from 5 different institutes/universities. The conference was well received by attendees and a follow-on workshop is planned for August 2020.

I presented a seminar on Data Visualization in a seminar in our department. This seminar focused on using visualization to effectively present research results to a diverse audience. Visualization is a critical element of data analytics and is an emerging research topic. The seminar was well attended with almost all our faculty members and students being present and actively participating.

Pursuing research is satisfying from a personal and professional perspective. My active research collaborative activities are critical for keeping myself updated on the latest happenings in the field. This allows me to bring in appropriate perspective and depth to the courses I teach. In particular, my recent research activities have helped me in the development of the new Machine learning course that I'm currently teaching and in constantly updating the department's classical Database course with introduction of the latest tools and techniques being used in the field. Bringing this expertise and content to the class advantages our students when they look for career options.

Narrative Summary of Service

During the last year, I contributed to service at the department, university, and professional level. At the department level, I attended and actively contributed to the discussions during the Board of Advisors meetings in the Spring and Fall semesters.

I was the computer science department representative for all open houses in Spring and Fall 2019. I proactively reached out to prospective students ahead of their visit and provided them information about our program.

I'm the computer science department delegate in the University senate. I attended all the senate meeting and actively participated in many of the discussions.

I'm an active advisor for ACM-Women (ACM-W) student clubs. I participated in all the meetings and on-campus activities and arranged and accompanied students to the ACM NYCWIC conference in May 2019. I worked closely with our students to review and revise their poster which won the best poster award in that conference. I also conducted resume workshop for our students along with Dr. Ladd in Fall 2019.

During the advising period, I met with all students to discuss their academic progress and pointed out resources, such as tutorship, that are available to students needing help with their course work. I also lent a sympathetic ear and tried to help them with their other issues that they wanted to discuss. I guided students to opportunities for internships and research experience (NSF's REU program) that I became aware of during the semester. I passed along the relevant information through email to all students and reminded my advisees in person.

I have been actively co-advising a PhD student in Clarkson University working on Big Data and Machine Learning. I also co-organized a 5-day workshop on Sensors and Data Analytics in Clarkson University in Aug 2019. I presented a seminar on Data visualization to the department that was attended by nearly the entire faculty and students in CS. I organized an informational seminar by two Data Analytics faculty from Clarkson University for our students.

Reflections on Service

At the department level, I'm actively participating in the Board of Advisors meetings because I believe that our external advisors need to have a full picture of our activities so they can meaningfully contribute to our growth. I also enthusiastically participate in all the open houses to ensure that our department continues to attract high quality students. To ensure success of our open house, I proactively reach out to prospective students ahead of their visit to give them information about our program and have them well prepared for a rich conversation with us during their visit. I also participate in Major Affairs to inform and attract undeclared-major students to our program. I believe this service is important for both the university and the students.

I'm the computer science department's delegate in the University senate. This service has been educational for me as I'm beginning to learn more about University governance, concerns of faculty and students in other schools and departments. I will be volunteering to help out with committees that might benefit from my input.

I have a keen interest in furthering our student's experience during their time here. As an example, I'm an active advisor for my department students' club, Association of Computing Machinery - Women (ACM-W). I participate in all the meetings and on-campus activities and arrange and accompany the students to off-campus conference trips. For the most recent ACM NYCWIC conference, I worked closely with our students to review and revise the poster and our efforts paid off with a best poster award. I present a yearly seminar to the students, to seed research ideas in them and these often get taken up as their senior projects. I also conducted resume workshop for our students along with Dr. Ladd in Fall 2019.

I take my advising role very seriously. I meet in person with each of my advisees at least once a semester. I take particular care to ensure that students who might be falling behind get the help that they need. I try to find out why they maybe underperforming and try to help in any way I can, including pointing out resources available to them. I encourage students who are doing well to keep them motivated. I use the advising opportunity to remind and inform students about outside university opportunities that I get to become aware of from my contacts. These include internships, research experience opportunities such as NSF's REU program, etc.

For my professional service, I advise graduate students, review papers for journals, present and organize workshops and seminars. I also bring in experts from outside to present to the department about latest research and open opportunities in Big Data and related fields.

I also provide community service with my role as a mentor for the "Friends of India Association (FIA)". FIA brings together students, staff, and community with interest in Indian culture and helps new students from India when they first come to Potsdam. As a mentor, I help with the club's organization and functioning and am one of the primary organizers of FIA's annual Diwali show.

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Prof. Supraja Gurajala
Assistant Professor
Department of Computer Science
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Office: (315) 267-2091

Date: February 16, 2020

To: Review committee

From: Dr. Supraja Gurajala, Assistant Professor, Computer Science Department

Re: Reappointment

Dear Committee members,

I'm pleased to present my file for reappointment as Assistant Professor in the Computer Science Department in SUNY Potsdam. I joined SUNY Potsdam as an instructor in Jan 2017 while still a PhD student in Computer Science at Clarkson University. Subsequently, I defended my PhD thesis in Aug 2018 and was appointed as an Assistant Professor in the Computer Science Department at SUNY Potsdam starting Fall 2018.

Since my last reappointment in the Spring of 2019, my major activities include: the introduction of a new course on Machine Learning for CS majors; publication of a peer-reviewed journal paper on Big data and a number of conference presentations; and co-organization of a workshop on data analytics in Clarkson University. In addition, I presented a seminar in our department, co-wrote a proposal to an external funding agency, and guided our students in an award-winning presentation at a conference. I was actively involved with students in their senior projects and was my department's delegate in the Senate and representative for all open house and major affairs. Full details of my teaching, research, and service activities are provided in the attached file.

I'm excited to be a part of SUNY Potsdam family and I look forward to my continued appointment as Assistant Professor in Computer Science and appreciate all the support I have received from the department, school, and the University.

Sincerely

Prof. Supraja Gurajala

Narrative Summary of Research

My research is in the field of Big Data, Machine Learning, and Data Analytics. I have been actively involved in research related to these fields in collaboration with faculty and students in Clarkson University and undergraduate students in our department.

Since my last reappointment (last Spring), I published 1 new peer-reviewed publication, entitled "Understanding Public Response to Air Quality using Tweet Analysis" in Social Media & Society Journal. My work was also presented in a major conference, the American Association for Aerosol Research, in October 2019, as a platform presentation. Additionally, I was actively involved in co-advising a PhD student in Clarkson University on research related to large sensor network data. This work was presented in two conferences, RAPS conference in Clarkson University (April 2019), and 13th Annual Probability and Statistics Day at the University of Maryland Baltimore County (April 2019). Recently, my work was accepted for a poster presentation in an international conference (Air Sensors International Conference) that will be held in May 2020. I submitted a pre-proposal to the Health Effects Institute (HEI) for the use of data analytics to extract public-health related information from air quality sensor data.

I was a co-organizer and instructor for a 5-day international workshop on Sensors and Data Analytics in August 2019. This workshop was attended by researchers and students from 5 universities/institutes. I was the core instructor for the sessions on practical Data Analytics.

I attended a workshop on Statistics called Bayesian Decision-Making and Applications in Clarkson University in April 2019. This workshop has been very helpful in my developing the new Machine Learning course that I'm currently offering. I also presented a seminar in our department entitled, "Data Visualization" in November 2019. This seminar was attended by almost the entire computer science department and was very well received.

Narrative Summary of Teaching

In my last six semesters at SUNY Potsdam, my teaching commitment has given me the opportunity to teach eight different courses. Of these, two courses were entirely conceptualized, developed, and taught by me. Developing one of these courses, CIS 431 Machine Learning, was my major new teaching initiative in the last year. This course, currently being offered (Spring 2020), will become part of a new Data Analytics concentration that we will be offering our students soon. For this concentration, I will also need to develop another new course, Big Data Architecture, in the coming semesters.

In the last 2 semesters, I have taught 5 different courses, including CIS 475, Introduction to Cryptography, (which was a new course that I introduced in Spring 2018), CIS 410: Computer Networks, CIS 420: Database Systems, CIS 201: Computer Science 1 (including lab; Spring and Fall), and CIS 301: Theory of computation. These courses include students from Freshmen to Seniors. I have been constantly revising these courses to keep up with changes in the field. These revisions include: introduction of a lab in the Computer Networks course, incorporation of Big Data concepts and projects in the Database course, and inclusion of research paper reviews in all 400-level courses.

In each of the courses I have taught, I have focused on effective student participation and activity-based learning through the use of in-class quizzes, group projects, and practical labs. I bring in practical examples to help students better relate to the topics. This point was noted by one of our students (Eric Zair ’20) in his interview for SUNY Potsdam’s CS Web page (https://www.potsdam.edu/academics/AAS/depts/CS/Zair).

Reflecting the effort that I put into the courses, my student evaluations, as in years past, were highly positive. My “overall rating of teacher” averaged for all my courses taught in 2019 was 1.42 (placing me between Excellent (rating 1) and Good (rating 2)). I was also fortunate to have my peers sit in several of my classes and evaluate me and they were highly positive about my offering. I always carefully look through the feedback from my students and peers to see how I can improve and modify my teaching style/content.

I’ve actively participated in University initiatives to bring new technologies to the classroom. Towards this end, I attended the Center for Creative Instruction workshop (Jan 2020) and plan on using some of the technologies introduced during the workshop to ensure teaching continuity is maintained during class cancellations because of weather or other reasons.

Overall, 2019 was an active period for me that has been filled with wonderful learning experiences and significant professional growth and I’m hoping 2020 will be more of the same.

Reflections on Teaching

At SUNY Potsdam, I have taught 8 different courses including two entirely new courses, ranging from freshman to senior level. I have had the opportunity to teach several of these courses multiple times. In each of these courses, the students have provided extensive feedback through the end-of-the-semester evaluation process. Additionally, I have also been fortunate to have my peers sit in several of my classes and provide me valuable comments about my teaching and the course material. All of this has meant that I have had plenty of feedback on my teaching to take a stock of what works and what needs to be changed.

My student evaluations have been largely very positive, with the "overall instructor rating" ranging from 1.0 to 1.8 (note: 1 is Excellent) for all my courses taught. As an example of a critical comment that I have often received in my initial offerings and tried to address is the one about the fast pace of my teaching. To address this problem, I have taken several measures, including consciously slowing down my material delivery pace, repeating important concepts multiple times, engaging students with questions and conversations, and switching from PowerPoint to writing on the blackboard. This has resulted in fewer complaints about the pace of my teaching but has not completely eliminated the problem. So I'll be continuing to put my effort in improving on this front.

In addition to feedback-based improvement, I have addressed some fundamental issues in existing courses on my own. For example, in the Database course, I introduced contemporary topics such as big data and NOSQL, keeping with the advances in the field. In the Computer Networks course, I felt that it was important for students to have a hands-on element to fully grasp the complex theoretical concepts. So when I took over the course, I immediately introduced a lab where students used a simulator to build near real-world networking systems and understand how a network of devices works. To increase engagement of students in my class, I have incorporated in-class weekly quizzes in all my courses. In all my senior courses, I require the students to work on projects and/or research paper reviews, as relevant for industry/graduate school.

The one problem I have had with my classes is related to sudden cancellations because of weather. These cancellations, when they unfortunately fall on the days when one particular course is offered, can have affect my ability to cover the entire syllabus on time. In the past, in response to such cancellations I have sometimes sub-consciously sped up my course. In a recent CCI workshop that I attended, I learnt of several different approaches by which I can address this problem and I expect to be trying out some of these in the coming semesters.

As an educator, it is important to not only provide students with the material to learn, but also create the right environment for learning. I recognize that students have a range of identities, and comfort levels in expressing then, and hence have taken care to be respectful of their choices and preferences while making them comfortable in reaching out to me as needed. I have also made sure that students in my class are always respectful to each other and have an environment where discussion is welcome. This is reflected in how several students visit my office hours (a minimum of 6 hours per week) regularly and even stop by after hours.

I am active participant and informal advisor for ACM-W, which is a society for female computer science students. The society includes several women from minority groups. Participation in this group has involved traveling to conferences with the students and also helping them in creating and presenting posters. This society has been a great source for us to promote computer science amount women and minorities consistent with the policies and DEI goals of SUNY Potsdam.

I have about ~ 20 advisees who I'm responsible for. I ensure that my advisees meet me during advising week where we discuss their progress report, future courses, and career plans. I attempt to get some feedback in terms of whether I have answered their questions to their satisfaction and also as to how else I could help them. I spend time with students who are under-performing, to try and find out how I and our department can help, including by providing tutor help, etc.

One of the courses I teach, CIS201, an introductory course on computer programming, is required for some students outside computer science. For these students, this course is not always one they are keen on. I have been working to find a balance between the needs of our students and that of non-CS students by appropriately tailoring HWs that are relatable to both sets of students and by providing significant lab help for these students.

Computer science is a fast-changing field, where new technologies, concepts, and applications are introduced almost every year. If our students are to be in demand in this field, we need to keep them abreast of the latest developments in the field and capable of joining the workforce in these fields. The department is, therefore, keen on new offerings that are most relevant to the current needs of industry. Towards this end, I have been one of the leaders in the department's efforts to develop two new concentrations – one on Computer Security and another on Data Analytics. To offer these concentrations, 6 new courses were required to be developed. I volunteered to develop 3 of these courses of which one (Introduction to Cryptography) was developed and offered twice already and another (Machine Learning) was developed last semester and am offering currently. I will be developing one additional new course in the next couple semesters. While these new courses are challenging to develop, they have been very rewarding for me. Two students reported back to me that in their job interview (with Lockheed Martin), knowledge from the new courses directly helped them secure a position.

Teaching at SUNY Potsdam has been a real pleasure for me. This job has been fun because of the wonderful interaction I have daily with my colleagues and students. When I see that our students really appreciate our effort (as noted by our ACM student president, Eric Zair, in a SUNY Potsdam news article - https://www.potsdam.edu/academics/AAS/depts/CS/Zair), I'm further motivated to keep improving and innovating in my teaching.