

Learning is a lifelong process, and computing sciences are no exception. Computing knowledge accumulates tremendously in a fast pace. My goal is to instill a genuine self-motivation in students that encourages them to continue learning beyond their graduation ceremony. As a teacher, advisor, and mentor, I am committed to equipping my students with appropriate knowledge and skills they require in their journey for becoming well-prepared and well-rounded next generation of scientists, researchers, engineers, and entrepreneurs.

My teaching philosophy is based on active and collaborative learning. I cover course materials in an engaging way that enables students to grasp the required knowledge, and at the same time, grows their passion to be self-reliant in attaining the continuous knowledge that stems in the field. I enjoy teaching in-person and mixed-mode (in-person and online) classes. I usually cover the general ideas with simplified examples and a visual aid. Asking questions is an integral part of my teaching, which normally sparks student's critical thinking and increases their active participation. I space my slides in a way that allows me to pose questions almost every 15 minutes about the material just presented. Students either provide answers spontaneously or are divided into small groups, where they can discuss their answers with their classmates before broadcasting them. This strategy fosters the culture of collaborative answers which improves active engagement of the students. I conclude every lecture with a short open discussion, where students express key principles in their own terms. I use this method to capture feedbacks from the students and prepare for the next class. Term project is an indispensable part of my courses. Learning-by-doing is well-rooted in my course design. I divide the course term project into several components that are well-synchronized with the flow of the knowledge obtained from the teaching materials. Each group is asked to work on closing the submission of each part by the end of few lectures. This way ensures that theoretical background is becoming well-acquainted stepwise, and it boosts the student's self-confidence and thirst for acquiring more knowledge. I found this framework effective and rewarding for any CS topic, including mainstream computer science courses. Nevertheless, whenever possible I design several courses with tailored strategies to cement the building blocks of student's knowledge. Some of those strategies are better explained hereafter in telling the story of my teaching journey. When appropriate, I spice the course with relevant hands-on experience which bring students closer to real-life problems. This seems to be efficiently rewarding and it is clear from the way undergraduate students conduct their final year projects and graduate students take on their thesis works.

Teaching Experience

My teaching and mentoring career is wide and spans many years of experience (2009 – current) in various settings. As part of responsibilities in my current position as a postdoctoral researcher in the Department of Computer Science and Engineering at University of Bologna, I am grateful to the opportunity of co-advising and mentoring several undergraduate students while they were doing their graduation projects. My responsibilities span several aspects, from teaching students how to design new methods and algorithms to mentoring their progress in terms of the software tools they use and the progress of writing their project reports. An example of my latest creative teaching strategy is an outstanding undergraduate dissertation that I had the honor to mentor and co-advise recently (2021) with Prof. Paolo Bellavista at University of Bologna, titled “*QoS-aware Cloud-based Meteo and Mobility Data Processing at Scale*”. I started by giving the student a variety of topics in big data management to choose from. He embarked on a topic that requires designing a novel indexing method for joining big mobility data with meteorological data. My teaching method was interactive. We had several open one-on-one discussions, thereafter I taught the student, the main principles of continuous Integration (CI) and continuous deployment (CD). The student became accustomed quickly to those concepts and started a GitHub repository for his project. I described each task for him using the scaffolding method, with each task I provided sufficient comments in Jupyter notebook cells. He would then push the outcome of each task to his GitHub repo and deploy accordingly. With every new part, he would then perform the CI and CD again. With my co-supervision, our student was able to design and build a standard-compliant prototype atop a de facto Cloud-based big data processing system known as Apache Spark. He also deployed his experiments with real-world data on a Microsoft Azure HDInsight cluster. The student commented that this was the most seamless, yet rewarding, experience in coding he ever encountered. It is gratifying to see students learn seamlessly in a rewarding manner. The student has now a “passion for the Cloud and the continuous learning” as he confidently described in his LinkedIn profile, and he is currently a DevOps engineer at one of the leading IT companies in Ireland. It is admirable to be able to pass on your passion of a subject matter to your students. My mentoring and advising

strategy focus on instilling a genuine desire in students to brainstorm research hypothesis based on the idea that their works should leave positive impacts on various real-world aspects, such as climate change. By doing so, I have noticed that students accumulate various skills beyond the pedagogical aspect. For example, it enables them to build domain-focused CVs and target employment opportunities in domains that they have enthusiasm to take on.

During my PhD studies at University of Bologna (2016 – 2020), Prof. Antonio Corradi entrusted me to co-advise his students on their term project for a graduate level course titled “*project work on infrastructures for cloud computing and big data*”. My responsibilities included being a mentor, co-adviser, facilitator, and moderator. This included one-on-one brainstorm meetings with the students, assisting them to select project title and scope. Also, educating them on the topic and facilitating their self-learning process by providing them with relevant materials that they may need to grasp main ideas and concepts. Then mentoring their project progress, during their tasks of writing codes, testing and deployment until writing their short reports of their projects. This expertise specifically is fascinating and equipped me with new skills working closely with graduate students. I apply an open-door policy, where my students can come to my office during my availability to discuss openly about their progress, in addition to assisting them to overcome the hurdles that may arise during their projects lifecycles. My co-advising and mentoring strategy is that I act as a facilitator and moderator, helping the students in choosing the right topic, then encouraging them to do the research on their own. Co-advising is a stimulating experience that expanded my research and teaching expertise and prepared me with the skills required for supervising a team of undergraduate and graduate level researchers soon.

During 2017/2018, as a TA at University of Bologna, I taught the lab of a graduate level course titled “Principles, Models and Applications for Distributed Systems”. My task was to prepare the materials, including slides and assignments, in addition to teach the lab. I was also responsible for preparing, conducting, and marking the lab exams. I taught students how to apply advanced programming concepts for designing and managing efficient distributed systems. My broad hands-on experience with distributed systems prepared me with immense knowledge appropriate for effectively teaching the lab. At the time, I specifically appreciated the knowledge I gained from previously working on several funded projects, basically designing novel solutions for distributed systems. It was gratifying to witness my knowledge and enthusiasm of the topic passes on seamlessly to students, in such a way that made them able to gain hands-on experience with the theoretical topics covered. Students evaluated my teaching with a very high ranking.

I also have a wide experience as a Lecturer at University of Business and Technology (UBT) in Saudi Arabia. For seven consecutive years (from 2009 to 2016), I was responsible for designing and teaching variety of undergraduate level courses including introductory and advanced computer programming, data structures and algorithms, databases, software design patterns and software engineering. I was also responsible for final year graduation projects, supervising students works at all levels, from topic selection to design and development, up to writing the project report and presenting their works. I always received from the students a very high ranking in teaching evaluation.

I recently (2021) proposed to co-teach a PhD course in the Department of Computer and Engineering at University of Bologna. Specifically in designing distributed geospatial data-intensive applications. My proposal was approved by the department council, and I am currently preparing the materials (the course is scheduled for the first quarter of 2022). Preparing and teaching this kind of domain-focused graduate courses require a strong theoretical background knowledge. Since my main research theme is deeply-rooted in distributed geospatial big data management, the course is expected to be an outstanding experience for me and a rewarding one for our PhD students.

Teaching Interests

I have a passion in preparing and teaching courses that are deeply related to my research interests, including big data management, databases, data warehousing, and recommender systems. In addition, I have the relevant expertise and knowledge that well-prepared me to teach variety of other courses in computer science including mainstream courses such as data structures, programming (basic and advanced levels) and software engineering. For graduate courses, I believe that research and teaching are strongly related. I love teaching courses in anything related to big data management and databases. I also have a passion in supervising and advising undergraduate level final year projects in addition to graduate level thesis works.