

Broader Impact Statement

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Partnerships with industry

My doctoral research has attracted a lot of engagement with the VFX and image&video editing industries. During my time at Disney Research, I have developed interactive methods which outperform the state-of-the-art in academia as well as commercial software used by a professional artist. The green-screen keying method I have developed has been implemented as a Nuke plug-in and delivered to Industrial Light and Magic (ILM) under the Disney umbrella. Similarly, my work on natural image matting has started collaborations with several Disney business units and has been delivered as a prototype for further development for professional use in movie post-production. I have also built strong connections with Adobe Research while I was at MIT. The semantic soft segmentation method I developed in collaboration with Sylvain Paris from Adobe Research is being investigated for further development for a commercial product.

One of the main research thrusts in my research plan is developing advanced image and video editing tools that encompasses physically realistic illumination editing using a three-dimensional understanding of the scene. This line of work has a lot of potential to create engagement with the industry, especially because the targeted capabilities will open up new interactive editing tools for virtual and augmented reality. My connections with Disney Research and Adobe Research, as well as with Microsoft Hololens through my Ph.D. advisor Marc Pollefeys, will be essential in realizing products that have the potential to create considerable impact in content creation.

Improving well-being of individuals

My primary research goal is to open up new use cases for computer graphics in the fields of cognitive science, neuroscience, and psychology. The main direction I would like to take is to study the effects of visual stimuli on humans. This includes working towards a better understanding of how specific visual attributes, such as illumination, geometry or semantics, affect us, and how to design virtual worlds or digital imagery that can induce specifically targeted emotions in humans.

A better understanding of the connections between visual stimuli and our emotional responses has very exciting possibilities for using virtual reality for therapeutic applications. There are already several treatment methods being studied using virtual reality, such as Virtual Reality Exposure Therapy for anxiety disorders. Computer graphics with a higher-level of qualitative understanding will be a valuable tool for developing better strategies for the use of virtual reality in psychological treatments. I am determined to start collaborations with psychology researchers that will open up new application scenarios for computer graphics in therapy.

Outreach activities

The issues behind the underrepresentation of women, the LGBT+ community and certain ethnic groups in academia begin at a societal level and are observable from the early stages of education. While these issues require immediate and comprehensive attention from the society in general, we as academics have a responsibility to target injustice not only in universities but in general through outreach activities and demonstrating our values that support diversity publicly. As a graduate assistant at METU, I volunteered to give talks to high-school students about my department, Electrical and Electronics Engineering. I was frequently asked by female students about the nature of my profession and the atmosphere in the department. I observed that even simply explaining the possible professional environments

for engineers and the undergraduate curriculum was able to change the perception of male dominance in the field. I hope to participate or lead in activities that target elementary and high-school students as a faculty member, especially in schools attended by dominantly underrepresented groups, which will help in achieving a long-term and sustainable increase in diversity in higher education.

Diversity in academia

I have been an international student since the beginning of my Ph.D. Becoming a part of an international community is an important stage in personal development, and it comes with many challenges. My group at ETH Zürich consisted of 22 people from 16 different nationalities when I started. I have experienced the importance of a culturally diverse group during my transition and saw how diversity creates a more welcoming atmosphere for young students from different backgrounds. A diverse group also provides students with an understanding of different cultures.

In the effort of creating a more diverse environment in my research group, I have supervised and mentored female Bachelor's and Master's students at ETH Zürich. For the research-oriented class 3D Vision, I supervised the only all-female project group in 2015 who presented the top-graded project on video synchronization at the end of the semester. From this group, Nadine Rüegg started a semester project in my research group with my recommendation and encouragement, later becoming a Ph.D. student at ETH Zürich in another group. I wrote the first recommendation letter in my career for my first Master's student, Shuang Wu. I have worked with Shuang for a year, beyond her Master's studies, and I encouraged her to be more assertive about the direction of her project during this time. In the end, after defending a successful thesis, she moved onto becoming a computer vision engineer at a private company in Austria. Perhaps my most meaningful experience supporting women in engineering is through my current office-mate, Tara Boroushaki, an Iranian undergraduate research intern in my group. Although I am not her research supervisor, we began a mentor relationship about her internship here and her Ph.D. application process through her questions on being an Iranian woman in academia and in Switzerland. To get her permission for mentioning her in this statement, I asked her about our discussions and their effect on how she perceives the academic environment. She told me that she is more confident about her place in research, in part due to realizing that the challenges she is facing are not due to her age or personality but due to the general atmosphere in this prominently male-dominated field. I see this as an important accomplishment on my side.

I aim to create a research group that encompasses different cultures, backgrounds, and identities, providing an inclusive environment where my students have a chance to develop a better understanding of the value of diversity. I am determined to achieve a minimum of 30 percent representation of women researchers in my group, which will create a more supportive environment for prospective students as well. Although the student pool is biased from the beginning due to the composition of undergraduate students in related technical fields, I believe a diverse group can be achieved with careful focus during the selection process that counts in the intrinsic personality traits that originate from the cultural or identity-based characteristics.