



جامعة الملك عبد الله  
للعلوم والتقنية  
King Abdullah University of  
Science and Technology

## Internship Opportunities

The IVUL group at KAUST is looking for motivated visiting students or interns all throughout the year, including Fall, Spring, and Summer semesters. We are interested in students in areas of engineering, math, computer science, statistics, or a related field, who have finished or are soon to finish their undergraduate degrees, or are currently enrolled in a masters program. These internships last for 4 to 6 months, and are heavily involved in scientific research on several fields of Computer Vision. Students will get a chance to work with top experts in the field, and get a scientific publication in a top-tier venue.

The IVUL group is part of the VCC at KAUST. Please follow the information below for details about both VCC and IVUL, as well as more information about KAUST's student visiting program. Visit the referenced web links to know more about our research.

For all interested students, please send a full CV with a complete list of your publications and projects, as well as, an unofficial academic transcript to Dr. Ali Thabet at [ali.thabet@kaust.edu.sa](mailto:ali.thabet@kaust.edu.sa).



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## Visual Computing Center (VCC)

Visual Computing is the science of sensing, modeling, simulating, processing, understanding, visualizing, and displaying all forms of visual information. Over the past decades, Visual Computing has become a key enabling technology for a diverse set of applications spanning scientific discovery, medicine, consumer electronics, and entertainment, to name just a few.

To solve problems in this vast space, the KAUST VCC draws from expertise in multiple disciplines, including Computer Science, Electrical Engineering, Mechanical Engineering, and Applied Mathematics, as well as a range of application domains. This interdisciplinary view allows for a pipeline approach including device development (e.g. computational cameras and displays), image and video understanding and semantic analysis, geometric modeling and understanding, simulation, and visualization. By considering this whole pipeline, more effective solutions can be found for problems in the mentioned application domains.

### Mission

The mission of the Visual Computing Center is to develop computational algorithms and tools for problems of relevance to KAUST, Saudi Arabia, and the world, with a particular focus on imaging, remote sensing, urban planning, and scientific visualization. The VCC is dedicated to bringing KAUST to the forefront of research in Visual Computing.

Research there focuses strongly on novel applications with a high potential for the advancement of science and technology. The Center serves as a focal point for interdisciplinary research, encompassing modeling, analysis, algorithm development, and simulation for problems arising throughout



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various fields in energy, environment, biosciences, earth sciences, materials science, and other disciplines.

## Vision

The vision of the VCC is to act as KAUST's interdisciplinary hub for Visual Computing research, and to be an internationally recognized leader in the field. The Center's unique pipeline approach ranging from devices to visualization with all intermediate stages investigated by a cohesive but interdisciplinary team of researchers will yield high-impact scientific results that are not possible with a narrower, disciplinary focus. This will allow us to tackle problems of unique importance to the Kingdom and create commercial opportunities in the form of startup companies as well as patents and licensing agreements.

Devices and software systems developed by the VCC will lead to new scientific insight across the KAUST campus, within Saudi Arabia, and internationally. These systems will be used for urban planning (e.g. city and road design) and public safety (e.g. control of pedestrian traffic during the Hajj) in the Kingdom.

Students, postdocs and research scientists play a vital role in the center activities and will be able to accept leadership positions in industry or academia after their work in the VCC.

For more information, visit <https://vcc.kaust.edu.sa>



## Image and Video Understanding Lab (IVUL)

At IVUL, we focus on interesting research problems that arise in computer vision, including activity recognition/detection, robust representations of objects for tracking and recognition, scene understanding from 3D data, image annotation, etc. Since our goal is to make sense of images and videos especially at large-scales, we also often end up developing new machine learning and optimization methods to help us achieve this goal.

Here are a few selected projects from our group:

### Action and Activity Recognition and Understanding

We are in the midst of a data revolution, where visual content has a protagonist role. For instance, YouTube reports that over 100 hours of video are uploaded every minute to their servers. Uploaded content ranges from a view of astronauts walking in space to the first steps of a baby at home. Our aim is to develop novel algorithms to automatically understand and recognize human activities from this huge visual space. We hope that our research brings the possibility to develop novel applications such as: video surveillance systems capable of detecting suspicious activities, automated household assistants, monitoring performance and understanding strategy in sports, and indexing content in web services. Below are some sample publications on this topic.

### Sim4CV: A photo-realistic simulator for computer vision applications

We present a photo-realistic training and evaluation simulator (Sim4CV) (<http://www.sim4cv.org>) with extensive applications across various fields of



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computer vision. Built on top of the Unreal Engine, the simulator integrates full featured physics based cars, unmanned aerial vehicles (UAVs), and animated human actors in diverse urban and suburban 3D environments. We demonstrate the versatility of the simulator with two case studies: autonomous UAV-based tracking of moving objects and autonomous driving using supervised learning. The simulator fully integrates both several state-of-the-art tracking algorithms with a benchmark evaluation tool and a deep neural network architecture for training vehicles to drive autonomously. It generates synthetic photo-realistic datasets with automatic ground truth annotations to easily extend existing real-world datasets and provides extensive synthetic data variety through its ability to reconfigure synthetic worlds on the fly using an automatic world generation tool.

Visit our website (<https://ivul.kaust.edu.sa>) and browse our publications and research themes to get a better understanding of the exciting work we have done.



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# KAUST Visiting Students Research Program (VSRP)

The Visiting Student Research Internship Program is an opportunity for exceptionally qualified international baccalaureate and post-baccalaureate students to conduct research with faculty mentors in selected areas of basic and applied research projects. The duration of the program ranges from between four and six months, depending on the research project. Arrival date must be a minimum of 6 weeks after date of submission.

To learn more: [VSRP Brochure](#).

KAUST VSRP visiting students will receive the following:

- Monthly living allowance ( \$1000 )
- Round-trip airfare to/from city of departure-Jeddah (KAUST)
- Health insurance
- Private bedroom and bath in a shared residential suite
- Visa fees (Students must have valid passport)
- Access to community recreational resources
- Social and cultural activities