Computer Science

Computational Photography and Capture (COMP0028)

**Description**

**Aims:**
The module is designed to be self-contained, introducing the theoretical and practical aspects of modern photography and capture algorithms to students with only limited background in visual computing. The two primary aims are i) to introduce universal models of colour, computer-controlled cameras, lighting and shape capture, and ii) to motivate students to choose among the topics presented for either continuing study (for those considering MSc's and PhD's) or future careers in the fields of advanced imaging.

**Learning outcomes:**
On successful completion of the module, a student will be able to:
- understand principles of light transport in natural scenes;
- understand principles of digital image formation;
- understand how computational-photography algorithms can exploit knowledge of these principles to transcend the capabilities of traditional photography;
- develop their own small software prototypes to capture and process digital images;

**Content:**
- Introduction to computational photography;
- Cameras, sensors and colour;
- High-dynamic-range imaging;
- The bilateral filter;
- Deblurring;
- Image compositing and blending;
- Carving, warping and morphing;
- Radiometry;
- Appearance acquisition;
- Intrinsic images;
- Structured-light 3D acquisition;
- Video texture synthesis;
- Video sprites;
- Image-based rendering;
- Video-based rendering of scenes;

**Key information**

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<tr>
<th>Year</th>
<th>2019/20</th>
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<tr>
<td>Credit value</td>
<td>15 (150 study hours)</td>
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<td>Delivery</td>
<td>PGT L7, Campus-based</td>
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<td>Reading List</td>
<td><a href="ucl.ac.uk">View on UCL website</a></td>
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<tr>
<td>Tutor</td>
<td>Prof Tim Weyrich</td>
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<td>Term</td>
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<td>Timetable</td>
<td><a href="ucl.ac.uk">View on UCL website</a></td>
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**Assessment**

- Report: 60%
- Coursework: 20%
- Coursework: 20%

**Find out more**

For more information about the department, programmes, relevant open days and to browse other modules, visit [ucl.ac.uk](ucl.ac.uk)

Disclaimer: All information correct as of August 2019. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
Requisites:
In order to be eligible to select this module, a student must be registered on a programme for which it is a formally-approved option or elective choice AND must have (i) completed Years 1-3 of an MEng Computer Science or MEng Computer Science with Electrical Engineering degree programme (or equivalent); (ii) A-Level maths; (iii) basic knowledge of Matlab.
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- Time-lapse video, analysis and editing.

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