



école doctorale sciences pour l'ingénieur et microtechniques

<b>Titre de la thèse/Thesis title: Material appearance from spectral video sequences</b>
<b>Laboratoire d'accueil / Host Laboratory : ImViA</b>
<b>Spécialité du doctorat préparé / Specialty : Instrumentation et informatique de l'image</b>
<b>Mots-clefs / Keywords : Spectral imaging, material appearance, video analysis</b>
<b>Descriptif détaillé de la thèse / Job description</b> <p>This project lies in the context of material appearance and advanced imaging technologies. We propose to use Spectral Filter Arrays (SFA) to capture information related to the human perception of several materials of different optical properties. Information is extracted, not from a single picture, but, from a video sequence of an object.</p> <p>Technically, there are different potential contributions in this project. The grant is free from constraints, and the research proposal will be built with the candidate based on discussions. There are three pillars in this project. <b>First</b>, to implement and use the optimal imaging pipeline to capture spectral video with a specific SFA sensor. <b>Second</b>, to define and study tools to handle and extract information from spectral video, so that objects can be captured and studied. <b>Third</b>, to extract information related to the perception of human observers. Applicants should position their research proposal within these three elements.</p>
<b>Références bibliographiques / Bibliography</b> <p>Lapray P-J, Wang X, Thomas J-B and Gouton P (2014), "Multispectral Filter Arrays: Recent Advances and Practical Implementation", Sensors. Vol. 14(11), pp. 21626</p> <p>Lapray P-J, Thomas J-B and Gouton P (2017), "High Dynamic Range Spectral Imaging Pipeline For Multispectral Filter Array Cameras", Sensors. Vol. 17(6), pp. 1281.</p> <p>Gigilashvili D, Thomas J-B, Hardeberg JY and Pedersen M, "Translucency perception: A review", Journal of Vision., 08, 2021. Vol. 21(8), pp. 4-4.</p> <p>Gigilashvili D, Thomas J-B, Pedersen M and Hardeberg JY (2021), "On the appearance of objects and materials: Qualitative analysis of experimental observations", Journal of the International Colour Association. Vol. 27, pp. 26-55.</p>
<b>Profil demandé / Applicant profile</b> <p>The ideal candidate has a Master degree in Computer science, Signal processing, or Optics, with majors in imaging, image processing, or/and light-matter interaction. Candidates with majors in computer graphics or cognitive psychology background are welcome to apply.</p> <p>The candidate must have:</p> <ul style="list-style-type: none"><li>-Good programming knowledge and experience in programming environments.</li><li>-Excellent communication skills in written and oral English.</li><li>-The quality of the research proposal will weight a lot in the selection.</li></ul> <p>Preferred selection criteria:</p> <ul style="list-style-type: none"><li>-Knowledge in: colour science, appearance-related metrology, psychophysical experiments, spectral imaging, video analysis.</li><li>-Knowledge in: quantitative &amp; qualitative research methods, experimental design, applied mathematics, statistical methods, machine learning and optimization.</li><li>-Enthusiasm for research, teamwork, and capability of independent problem-solving.</li></ul> <p>Personal characteristics:</p> <ul style="list-style-type: none"><li>-Ability to work individually and a high level of personal responsibility.</li><li>-Ability to meet deadlines and produce work of a consistently high standard.</li><li>-High motivation for research work.</li><li>-Eager to disseminate research results through publications and presentations at international conferences.</li></ul>

**Financement : MESRI établissement**

Dossier à envoyer pour le 20/05/2022

Début du contrat : 1<sup>er</sup> Octobre 2022

Salaire mensuel brut : 1975€

**Direction de la thèse : Thesis Supervisor**

- **Dr. THOMAS Jean-Baptiste / jean-baptiste.thomas@u-bourgogne.fr**

**Encadrement de la thèse : co-directeur(s) et co-encadrant(s)**

- **Pr. GOUTON Pierre (UB) / Co-directeur**
- **Pr. HARDEBERG Jon Y (NTNU) / Co-directeur**

Applicants are invited to submit their application to the PhD supervisors.

Application must contain the following documents merged as a single pdf:

- CV
- Cover letter
- Grade transcripts
- Research proposal (maximum 3 pages + bibliography)
- Reference letters (maximum 3)