

# ERASMUS MUNDUS JOINT MASTER DEGREE

# CO·SI

COLOUR IN SCIENCE AND INDUSTRY



University  
of Eastern  
Finland



Gjøvik  
University  
College



University  
of Granada



University  
Jean Monnet



# IN A NUTSHELL

WE ARE a unique academic / industrial consortium in colour science offering 2 Master's Degrees designed and operated by a unique world leading university-business cooperation of 4 European universities, 5 Asian universities and 15 industrial leaders across the globe:

## **COSI / COLOUR IN SCIENCE AND INDUSTRY /**

a two-year scientific Erasmus+ Joint Master's Degree, aiming to train the next generation of highly-skilled industrial experts in applied colour science, in various cutting-edge industries (photonics, optics, spectral imaging, multimedia technologies, computer graphics and vision) in a diverse range of sectors (including multimedia, health care, cosmetic, automotive, food-processing) bridging a talent gap in the industry where colour experts are in high demand. The 2 area of focus are spectral technologies and applied colour imaging.

# WHO WE ARE

global academic excellence meeting worldwide colour markets

**PANTONE**  
**Pro. Cyan C**

R 0 G 159 B 218

**PANTONE**  
**Pro. Cyan PC**

C M Y K  
100 0 0 0

# WHO ARE WE



University of Eastern Finland



Gjøvik University College



University Jean Monnet



University of Granada



MONASH University Malaysia



จุฬาลงกรณ์มหาวิทยาลัย  
Chulalongkorn University  
Pillar of the Kingdom



TOYOHASHI UNIVERSITY OF TECHNOLOGY

OLYMPUS  
Your Vision, Our Future

SPECIM  
SPECTRAL IMAGING

tecnalia Inspiring Business

\_SC  
SOFTCOLOR

chromasens  
Imaging for Professionals

A group of seven diverse young adults, including men and women of various ethnicities, are walking across a green lawn. They are dressed in casual, contemporary clothing. In the background, there is a large, multi-story stone building with arched windows and a large tree with dense foliage. The scene is brightly lit, suggesting a sunny day.

## ABOUT ERASMUS+

Combines 7 EU education, training and youth programmes, and introduces sport for the first time

Total budget of €14.7 billion, representing a 40% budget increase

# UNIVERSITY JEAN MONNET

A multidisciplinary university, training over 20,000 students in 2015/2016, 5600 graduates every year and a 133 millions € budget

Part of University of Lyon, a leader in higher education:

**the most important French university site outside the Paris region and one of the top 10 European universities with 120,000 students,**

5,000 PhD students, 16 doctoral schools, 550 public & private laboratories and 11,500 academic and research staff.

University Jean Monnet is the Coordinating Institution of COSI programme.

# UNIVERSITY OF GRANADA

Founded almost five hundred years ago, in 1531, UGR is one of Europe's top-ranking international universities, coming first in many international mobility statistics.

UGR has been voted the number one study destination in Spain by international students, obtaining the prestigious International Student Satisfaction Gold Award from StudyPortals in 2013.

University of Granada is ranked among the top 3% of HE institutions worldwide

# UNIVERSITY OF EASTERN FINLAND

One of the largest universities in Finland, and home to approximately 15,000 students and 2,800 members of staff.

The University of Eastern Finland, UEF, considers international cooperation and internationalisation as one of the cornerstones of its activities. The university is an active member of the international scientific community, thus seeking to reach the highest standards in both research and education.

Among the leading 300 universities in the world in several international rankings.



Gjøvik University College will January 1st 2016 merge with Norwegian University of Science and Technology (NTNU), Sør-Trøndelag University College (HiST) and Ålesund University College (AaUC).

These four institutions will become the largest university in Norway with more than 38 000 students and 6400 employees.

# ACADEMIC COORDINATION



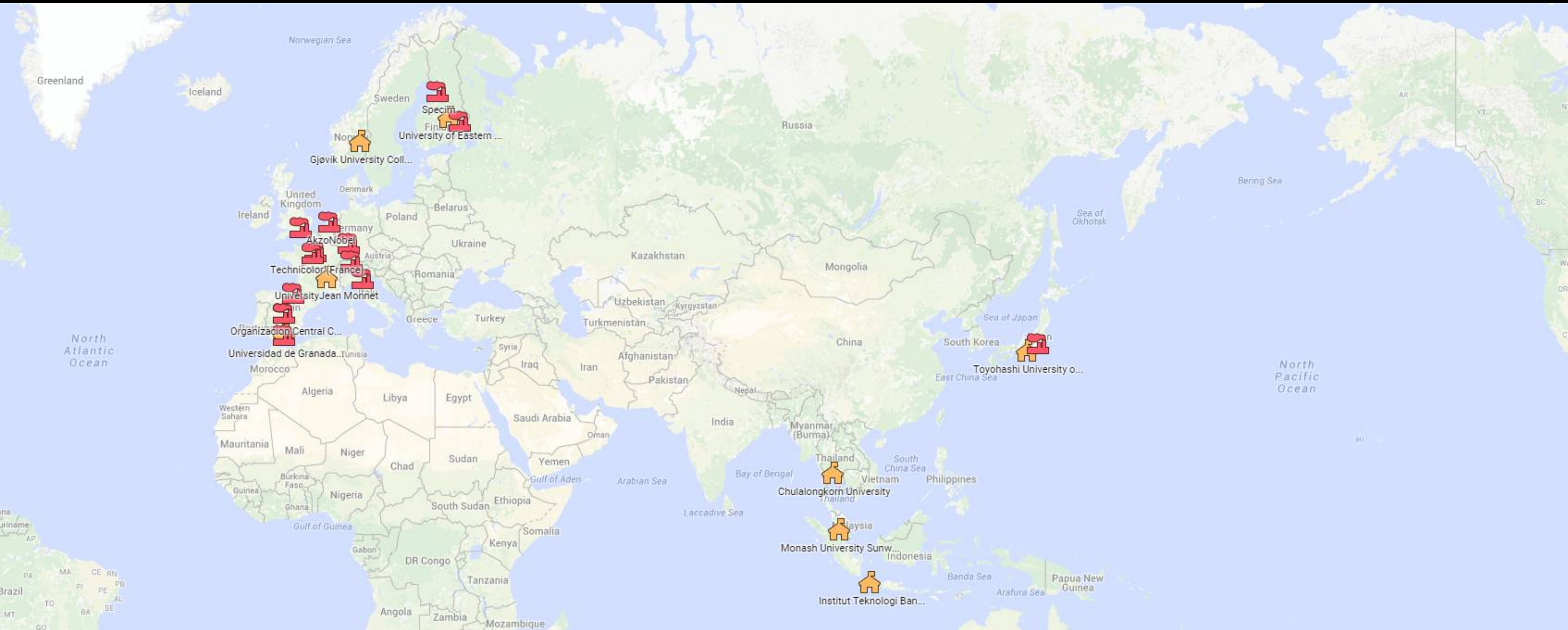
Alain Trémeau, Professor, academic coordinator for Saint-Etienne

Juan Luis Nieves, Professor, academic coordinator for Granada







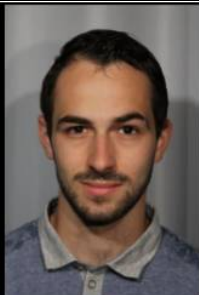

























Jon Ynge Hardeberg, Professor, academic coordinator for Gjøvik

Markku Hauta Kasari, Professor, academic coordinator for Joensuu

# INTERNATIONAL OUTREACH - PARTNERS



# INTAKE 1 / 2015-2017 /

							
<b>ALIZADEH RAZIN</b> Alireza  (Iran)	<b>BELIAKOVA</b> Alina  (Russia)	<b>BISWAS</b> Pooshpanjan Roy  (India)	<b>BISWAS</b> Sourodeep  (India)	<b>GUDZENCHUK</b> Anastasiia  (Russia)	<b>GURDIEL</b> Enrique  (Spain)	<b>LANDRÉ</b> Victor  (France)	<b>MANIHATTY</b> Thiyagarajan  (India)
							
<b>CHEREPKOVA</b> Olga  (Russia)	<b>COOPER</b> Sean  (United States)	<b>FRAZA</b> Charlotte Johanna  (Netherlands)	<b>GIGILASHVILI</b> Davit  (Georgia)	<b>MAO</b> Ruiquan  (China)	<b>PLERKSOPHON</b> Ektawat  (Thailand)	<b>SHAO</b> Shuxiao  (China)	<b>TALABI</b> Opeyemi Mathew  (Nigeria)





# COSI MASTER DEGREE

# BUILT-IN MOBILITY



University of Eastern Finland



Gjøvik University College



University Jean Monnet



University of Granada

semester 1 – foundational courses  
UNIVERSITY JEAN MONNET

semester 2 – fundamentals and pre-concentration courses  
UNIVERSITY OF GRANADA

semester 3 – concentrations & specialization courses Spectral Technologies  
UNIVERSITY OF EASTERN FINLAND

semester 3 – concentrations & specialization courses Applied color imaging  
GJØVIK UNIVERSITY COLLEGE

semester 4 – professionalization  
INDUSTRIAL PARTNERS



# CURRICULUM – SEMESTER 1

	Hosting Institution Learning rationale	University Jean Monnet Refresher & Fundamentals courses
<b>Core Teaching Modules</b>		<b>= 30 ECTS</b>
<b>Mandatory courses</b>		<b>= 30 ECTS</b>
Applied Photonics and Optics		5 ECTS
Applied Colour Science**		5 ECTS
Digital Image Fundamentals		5 ECTS
Data Analysis and Statistics		5 ECTS
Introduction to scientific programming		5 ECTS
Introduction to specialization fields and industrial study cases*		5 ECTS
<b>Optional courses</b>		<b>Extra ECTS granted</b>
Introduction to Matlab (prerequisite)		5 ECTS
Introduction to Fourier optics		5 ECTS
Physical optics		5 ECTS
Nonlinear optics		5 ECTS
Introduction to radiometry		5 ECTS
Optical models for colored surfaces		5 ECTS
3D visualization and GPGPU		5 ECTS
French language and culture		2 ECTS



# CURRICULUM – SEMESTER 2

Hosting Institution	University of Granada
Learning rationale	Fundamentals & Pre-concentrations courses
<b>Core Teaching Modules</b>	<b>= 30 ECTS</b>
<b>Mandatory courses</b>	<b>= 20 ECTS</b>
Applied Advanced Colorimetry**	5 ECTS
Human Perception and Cognition	5 ECTS
Digital Innovation and Entrepreneurship*	5 ECTS
Fundamentals of Spectral Science	5 ECTS
<b>Elective concentration courses</b>	<b>= 10 ECTS at least (Students must take 2 course at least)</b>
Concentration in Spectral Technologies	5 ECTS
Radiometry, Sources & Detectors	5 ECTS
Image Acquisition and Reproduction**	5 ECTS
Fourier Optics	5 ECTS
Concentration in Applied Colour Imaging**	5 ECTS
Advanced Colour Image Processing	5 ECTS
Computer vision	5 ECTS
Project in Computer vision	5 ECTS
Data science	5 ECTS
<b>Optional courses</b>	<b>Extra ECTS granted</b>
Spanish language and culture	2 ECTS

# CURRICULUM – SUMMER BREAK



Hosting Institution Learning rationale	<b>Associated industrial Partners or Supporting Partners</b> <b>Professionalization</b>
Optional, internship report	No Extra ECTS

# CURRICULUM – SEMESTER 3

Hosting Institution Learning rationale	University of Eastern Finland Concentrations & Specialization courses in Spectral Technologies
<b>Core Teaching Modules</b>	<b>= 30 ECTS</b>
<b>Mandatory courses</b>	<b>= 20 ECTS</b>
Color Science Laboratory	5 ECTS
Industrial and Biomedical Optics	5 ECTS
Spectral Imaging Devices	5 ECTS
Industrial Projects	5 ECTS
<b>Elective specialization courses</b>	<b>= 10 ECTS at least</b> (Students must take 2 course at least)
Computational Colour	5 ECTS
Display Technologies	5 ECTS
Machine Vision	5 ECTS
Pattern Recognition	5 ECTS
<b>Optional courses</b>	<b>Extra ECTS granted</b>
Finish language and culture	2 ECTS

# CURRICULUM – SEMESTER 3

	Hosting Institution Learning rationale	<b>Gjøvik University College Concentrations &amp; Specialization courses in Applied Colour Imaging</b>
<b>Core Teaching Modules</b>		<b>= 30 ECTS</b>
<b>Mandatory courses</b>		<b>= 20 ECTS</b>
Colour in medical imaging		5 ECTS
Selected topics in colour imaging		5 ECTS
Colour image quality and processing in an imaging workflow		5 ECTS
Industrial projects		5 ECTS
<b>Elective specialization courses</b>		<b>= 10 ECTS at least</b> (Students must take 2 course at least)
Advanced course in video processing		5 ECTS
Advanced colour management		5 ECTS
Content-based indexing and retrieval		5 ECTS
Machine learning and Pattern recognition		5 ECTS
<b>Optional courses</b>		<b>Extra ECTS granted</b>
Norwegian language and culture		2 ECTS

# CURRICULUM – SEMESTER 4



Hosting Institution

**Associated Industrial Partners**

(or)

**Associated industrial Partners or Supporting Partners**

Learning rationale

Professionalization

**Master Thesis**

**= 30 ECTS**

# MULTIPLE DIPLOMAS AWARDED

awarding Institution	national degrees awarded, official name in local language	national degrees awarded, legalized English translation	National accreditation institution / legal basis
<b>University Jean Monnet</b>	Master Optics, Image, Vision, Multimedia Diplôme d'Université "COlour in Science and Industry" on behalf of COSI consortium.	Master Optics, Image, Vision, Multimedia	approved by the French Ministry of Higher Education and Research in 2004, reaccredited A+ in 2011; Arrêté du 10 octobre 2011, Reference CNESER 20070679
<b>University of Granada</b>	Master Universitario en Ciencia y Tecnologia del Color	Master in Color in Science and Industry	To be approved by the Spanish Ministry of Education
<b>Univesity of Eastern Finland</b>	Filosofian maisteri, tietojenkäsittelytiede	Master of Science in Computer Science, Color in Science and Industry	Finnish Ministry of Education decree 794/2004. Master's programme: Finnish Ministry of Education decree 1665/ 2009
<b>Gjøvik University College</b>		Master in Applied Computer Science (concentration track included)	approved by the Norwegian Ministry of education and Research since 31-May-2005.

## EUROPEAN MASTER'S DEGREES IN COLOUR SCIENCE



PROGRAMMES ▾

APPLICATION ▾

COMMUNITY ▾

CORPORATE RELATIONS

apply to COSI Master Degree >

apply to CIMET Master Degree >

COSI / selection outcome

CIMET / selection outcome

appeal procedure

Guest lecturers

FAQs

scholarships & participation costs >

who can apply

how to apply >

online application

next steps

application assessment

WE ARE a European  
and operated by  
universities, 5 Asian

ence offering 2 Master's Degrees de  
ity-business cooperation of 4 Eur  
ers across the globe:

### COSI / COLOUR IN SCIENCE AND INDUSTRY /

a two-year scientific Erasmus+ Joint Master's Degree, aiming to train the next generation of highly-skilled industrial experts in applied colour science, in various cutting-edge industries (photonics, optics, spectral imaging, multimedia technologies, computer graphics and vision) in a diverse range of sectors (including multimedia, health care, cosmetic, automotive, food-processing) bridging a talent gap in the industry where colour experts are in high demand. The 2 area of focus are spectral technologies and applied colour imaging.

**CALL FOR APPLICATIONS FOR 2016-2018 intake will be opened in November 2015**

APPLY

### CIMET / COLOUR IN INFORMATICS AND MEDIA TECHNOLOGY /

**We're looking for brilliant minds**

Holders of a bachelor of science in computer science and/or physics and/or mathematics

[master-colourscience.eu](http://master-colourscience.eu)

Contacts

Academic coordinator | Alain Trémeau | [alain.tremeau@univ-st-etienne.fr](mailto:alain.tremeau@univ-st-etienne.fr)

International development | Thomas Chaumont | [thomas.chaumont@univ-st-etienne.fr](mailto:thomas.chaumont@univ-st-etienne.fr)

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