iPSRS

Intelligent Photonics for Security Reliability Sustainability & Safety

The iPSRS Newsletter

2nd Edition

iPSRS students in Cleanroom (Lab visit)

Top News

iPSRS (Intelligent Photonics for Security, Reliability, and Sustainability) has secured another round of EU funding in 2024! As a result, our program was invited to participate in the Erasmus Mundus Joint Master's (EMJM) Kick-off Meeting, held on 21-22 November 2024 in Brussels. Representing iPSRS at the event were Prof. Nathalie Destouches, Consortium Coordinator, and Rajon Bhuiyan, Project Coordinator. This gathering brought together coordinators of new EMJM programs to discuss implementation, management, and promotion strategies
This milestone marks an exciting phase for iPSRS, formerly known as PSRS. With its new direction, the program has evolved to integrate Artificial Intelligence (AI) into its curriculum, reinforcing its mission to equip students with cutting-edge expertise in photonics and emerging technologies.

Exploring the Future of Photonics: a vision for innovation and entrepreneurship

Interview with Professor Jyrki Saarinen, Head of the Department of Physics and Mathematics and Head of the Center for Photonics Sciences, University of Eastern Finland

Interview by: Teagan

Professor Dr. Jyrki Saarinen is a lecturer and the head of the Photonics Research Community, the Center for Photonic Sciences, and the Department of Physics and Mathematics at the University of Eastern Finland. Impressively, these endeavors are just the most recent in a long list of Dr. Saarinen's accomplishments. Professor Saarinen is a seasoned entrepreneur who has founded multiple technology companies in the field of photonics. Appropriately, he is leading a course titled Commercialization of High-Tech which many of the iPSRS students have elected to take this semester. By attending his lectures, you can really tell that he has a passion for innovation and inspiring the next generation of technological change makers.

I had the pleasure of sitting down with Dr. Saarinen to ask him some questions about his experiences in the professional world of high-tech. I began by asking him why he thought that right now was such an exciting time to enter into the field of photonics. He responded by saying that there is a great need, at the moment, for the collection of environmental data and photonics will be the way to do this. It is necessary to use spectroscopy and other photonics based methods to monitor the levels of certain gases within the environment in order to drive change and prescribe the correct approach to ensure an environmentally sustainable future.

As the iPSRS students are currently studying at the University of Eastern Finland in Joensuu, Finland. It is evident that photonics has a large place in the Finnish scientific community and it really has a lot of opportunities in photonics that the PSRS and iPSRS students can take advantage of. I asked Dr. Saarinen why he thought that Finland has had such success building up this industry. In response, he mentioned that Finland boasts the highest number of photonics companies per capita compared to any other European country. He claimed that this was due to the initial development of the field in the country beginning in university physics laboratories. Ultimately, photonics experiments can be completed using relatively cheap materials therefore, the physics departments began leaning towards photonics research. In this way, the photonics in Finland is based on "modern optics" and physics as opposed to traditional electronics, mechanics, and engineering. It was also mentioned that there is a large collaboration between universities where each of them focus - for the most part - on different areas of photonics to have a more well rounded understanding of the field throughout the country.

On the other hand, Dr. Saarinen has spent a lot of his professional life outside of Finland, specifically in the United States. He told me that while in the US he began 'cold-calling' companies to promote his product - to his surprise one of his cold-calls turned into a client meeting and ultimately a business deal. In his experience, this was the only country that he found this marketing strategy to be effective. The PSRS and iPSRS students should find this story very pertinent to their current experiences working and living in a foreign country. The takeaway is ultimately that the standards and expectations in business can differ largely from country to country. For this reason, it is important for students to learn about the professional culture wherever one may be working in order to not miss out on opportunities that may not have been available in other countries.

Dr. Saarinen shared a lot of great advice, anecdotes, and insight regarding the photonics industry. The students are certainly lucky to have the chance to learn from someone who has made so many great accomplishments in their field and who genuinely wishes the same success for his students.

iPSRS Industrial Workshop 2024: Connecting Students with Industry

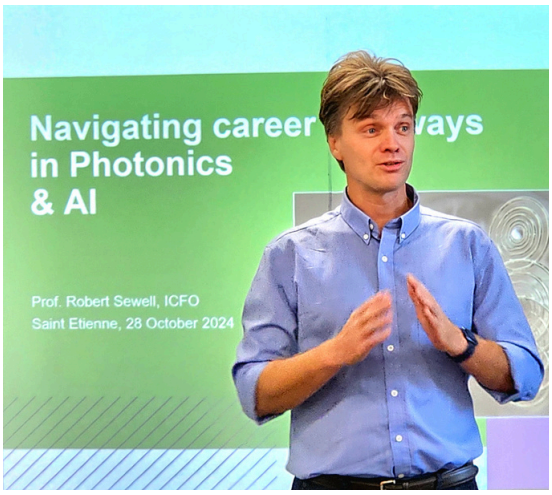
Highlights from Day 1: Building a Career in Photonics and AI: Professional Development & Networking Workshop

iPSRS Industrial Workshop 2024 took place in October 2024 at the Jean Monnet University (UJM) in Saint-Étienne, France, providing students with an opportunity to engage with industry leaders in photonics and AI. The event featured expert talks, presentations and panel discussions to help students navigate career paths and industry trends.

CAREER DEVELOPMENT

Dr. Robert Sewell from ICFO, emphasized the importance of proactively seeking research labs and facilities. Discussed reasons to pursue a PhD; including research passion and international experience. Introduced the Concept of "satisficing" in decision-making for good-enough decisions.

"People who are intrinsically motivated in what they do thrive, and people who are extrinsically motivated by what they do struggle."



WELCOME REMARKS

The opening session of the first IPSRS industrial day for 2024. It was open to all students in the campus, including PSRS and iPSRS students.

The day started with remarks and agenda of the day from Prof Dr. Nathalie Destouches

NETWORKING

Rajon Bhuiyan from 'Erasmus Mundus Students and Alumni Association (EMA)', also the iPSRS Project Coordinator, shared a personal story on networking's role in securing a master's internship and jobs. Presented important networking tips, including setting goals, using LinkedIn and social media, and actively participating in industry events.

"Volunteers do not get paid not because they are worthless but because they are priceless."

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ERASMUS MUNDUS JOINT MASTER
Intelligent Photonics for Security Reliability Sustainability & Safety

iPSRS Industrial Workshop 2024: Connecting Students with Industry

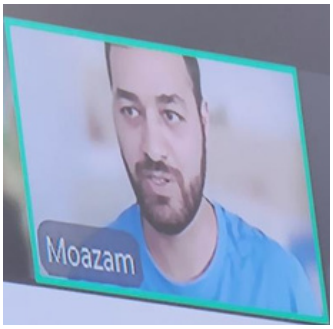
Highlights from Day 1: Alumni Panel – Experiences and Insights in the Field of Photonics and AI

Francisco Matos discussed his career path and PhD work with time localization microscopy . He advised using resources like Euraxxes, Scholarship DB for opportunities highlighting the importance of adaptability.

Hector Gomez shared his career at Zeiss and his industrial PhD in Germany, highlighting work-life balance. His advice: be autonomous, adaptable, plan ahead, and stay positive despite any challenges.

Pratibha Sharma discussed her shift from tech to management, her current role in digital marketing, and challenges like budgets and communication gaps. Her advice: keep learning, build teamwork skills, and seek mentorship.

Round table discussion topics: Skills for photonics and AI (PhD): Machine learning, problem-solving, leadership, communication. EMJM preparation: Builds adaptability and skills. Advice: Be focused, adapt, and manage paperwork.



Mohammad Moazam shared his path as an ML Engineer at Stellantis and discussed challenges like security and data privacy. His advice: focus on health, teamwork, creative thinking, and building communication skills.

Sumit shared his career path, including his PhD in photonics, and advised focusing on networking, programming skills (Python, LabVIEW, Zemax, COMSOL), and maintaining strong grades for funding opportunities.

Duc Le shared his journey from Engineering Physics in Vietnam to a PhD at UEF and VTT, where he works on nanophotonics biosensors. He highlighted the importance of honesty, open-mindedness, and self-motivation.

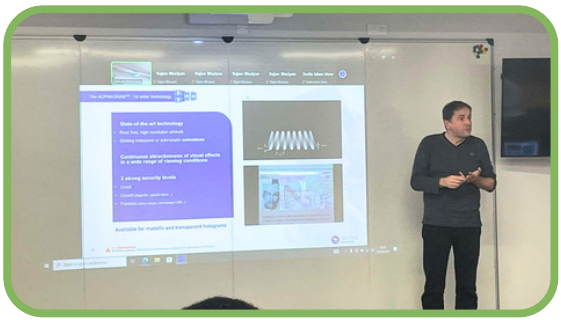
Atland Boksi shared his journey in photonics in Lionix international, emphasizing the importance of choosing internships, projects, and developing leadership, networking, and adaptability skills.

iPSRS Industrial Workshop 2024: Connecting Students with Industry

Highlights from Day 2: Visual Security of Official Documents

Pierre Orszag,
Responsible for identity documents,
ANTS DDT

"Optical technologies are considered an asset of this field. The market adapts quickly thus we have to stay on the edge"

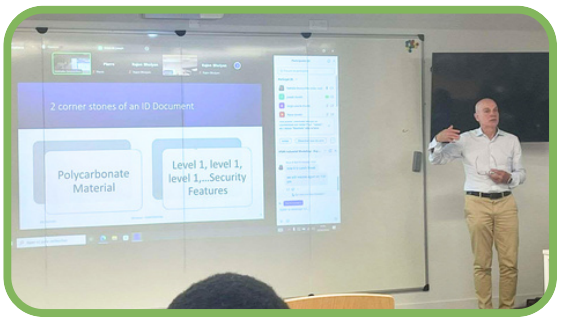


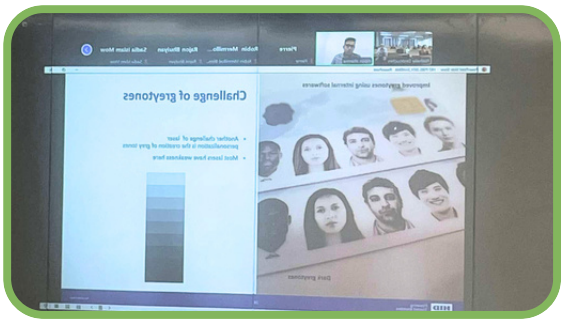
Valéry Petiton,
R&D Director, SURYS INGROU

"Graphic design, Mastering/Origination lab, Structures and Materials Lab, Application lab, and production, are the skills needed to increase security"

Joseph Leibenguth,
Co-founder, VALMIDO

"Document security depend on Document material, Security features, Personalization technology, and Integrated electronics"



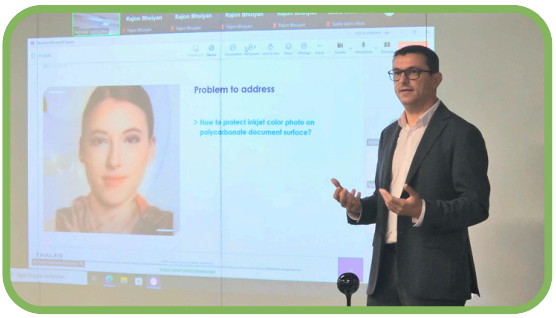


Nipun Sharma,
Engineering manager, HID

"Laser is an important component and plays a crucial part in the field of identity documents and security"

Christophe Bousquet,
Product Group and R&D Director - Physical Documents Security, Thales DIS

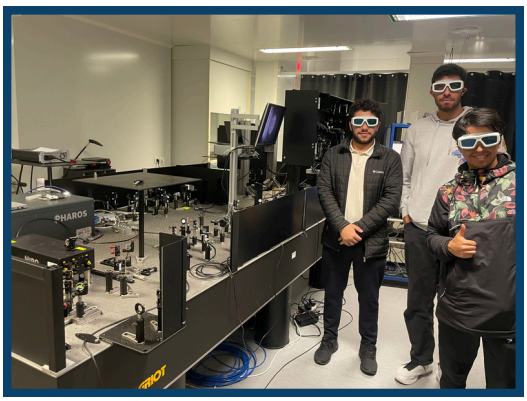
"Hiding in clear sight to secure"



iPSRS Industrial Workshop 2024: Connecting Students with Industry

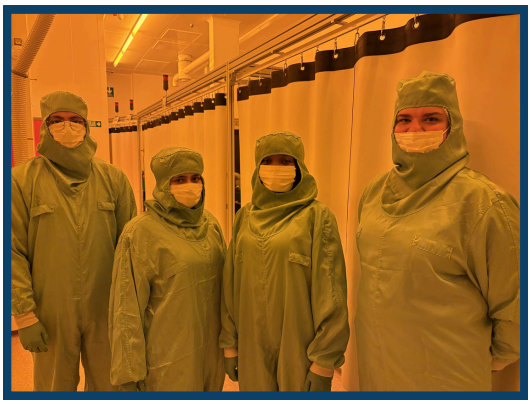
Highlights from Day 3 & 4: visits and practical sessions

On the third day of the workshop, our students had an opportunity to immerse themselves in cutting-edge research and innovation in laser and photonic technologies.



Visit to MANUTECH USD

Students explored the femtosecond laser platform, gaining firsthand insight into how ultra-short laser pulses are transforming modern manufacturing. From precision micro-machining to advanced material processing, the visit showcased how photonics is revolutionizing industry applications.

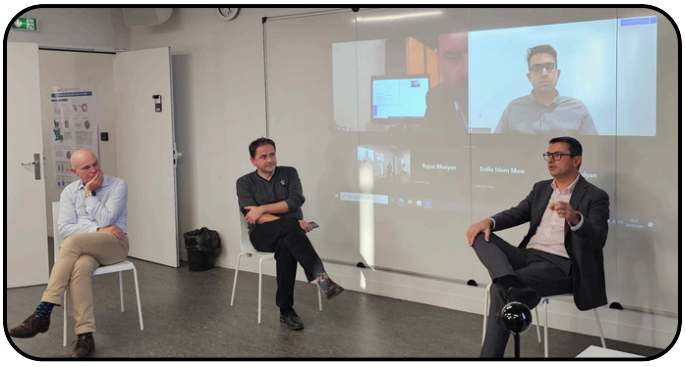


Visit at Laboratoire Hubert Curien

At the Laboratoire Hubert Curien, students engaged with three PhD researchers, Marie Traynar, Fayad Ali Banna and Sylvain Georges, who shared their work and experiences in photonics.

A huge thank you to Manutech USD and the team at Laboratory Hubert Curien for welcoming our students.

Round Table Highlight: Career Insights & Industry Trends



A highlight of the workshop was the Round Table Discussion, where our alumni and industry professionals shared valuable insights on career paths, emerging trends, and essential skills for photonics and AI. They emphasized the importance of machine learning, leadership, and adaptability—especially for those pursuing PhDs.

The session also highlighted how the EMJM program prepares students for global careers in industry and academia and offered practical tips on staying focused, flexible, and organized.

Celebrating Achievements and Building Connections

Recognizing Excellence and Strengthening the iPSRS Community

Success at the MANUTECH SLEIGHT Event

Felipe won the Best Pitch Award at the "Manutech Sleight" event! His presentation showcased the impressive results of his summer internship (done in 2024), which was conducted at the 'Hubert Curien Laboratory' under the supervision of Prof. Nathalie Destouches and co-supervision of Thibault GIRARDIN (a PhD candidate).

Felipe's work highlighted his research in photonics and demonstrated the impact of iPSRS training in preparing students for excellence.

Felipe shares: "I am very happy that I gave my best for this event and that it came with its rewards. I couldn't have done it without the incredible support of Prof. Nathalie Destouches, who let me be part of her project. Thank you!"

Launch of the iPSRS Mentorship Program

Recognizing the value of peer guidance, our current students expressed interest in having alumni mentors. When we reached out, 10 graduates stepped forward to support them. Among them is Duc Lee (Cohort 2020 – 2022), who recently completed his PhD and is now a Research Scientist at VTT, Finland. Reflecting on his role, he shared: *"One key benefit of mentorship is helping mentees understand what they need to prepare for after graduation, including internship opportunities."*

One of the mentees, Adrian Garza Zapata, a student of cohort 2024-2026, says that *"The mentorship program has provided the opportunity to receive precise and valuable feedback from alumni who have been in the same position as us in the past years. Sometimes it is challenging and overwhelming to balance student and personal life on top of thinking about your future in terms of internships and thesis placements, but talking with your mentor helps you think clearly and calmly about making the most of the opportunities you currently have. The conversations with my mentor, Francisco Mantos, have greatly helped me in defining the path that I want to take in my career, while also learning about unique opportunities that I wouldn't have found by myself. It's encouraging as an international student to know that you have direct communication with someone always willing to help you, whether it's for doubts about classes or professional life."*

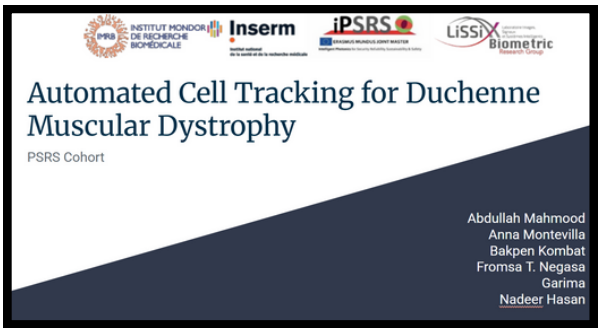
Preparing for Master Thesis Internships: the M2 experience (Cohort 2023-25)

An update of learning paths and projects developed during their third semester

The **Université Paris-Est Créteil (UPEC)** has cultivated a strong research culture among its PSRS M2 students specializing in **Intelligent Vision and Biometrics**. As part of their semester work, the students undertook a collaborative research project between the Laboratoire Images, Signaux et Systèmes Intelligents (LISSI) and the Institut Mondor de Recherche Biomédicale (IMRB). Supervised by Régis Fournier from the LISSI lab and Sophie Féréol from the IMRB lab, the students worked on automating cell tracking for Duchenne Muscular Dystrophy disease throughout their third semester. This project provided students with the opportunity to engage in advanced research, honing their skills in data analysis, algorithm implementation, and scientific collaboration. This semester-long projects not only enriched their academic experience but also equipped them with valuable expertise for careers in research and industry.

Abdullah, an M2 student, who chose to continue working on this project as his master thesis, shared his experience:

"In our M2 project, we focused on analyzing blood cell migration within a biomedical dataset, with the goal of optimizing tracking accuracy and robustness. This research was a collaborative effort between the Institut Mondor de Recherche Biomédicale (IMRB, U955 INSERM) and the Laboratoire Images, Signaux et Systèmes Intelligents (LISSI Laboratory, Vitry-sur-Seine), two laboratories of Université Paris-Est Créteil. Together, we systematically implemented and evaluated a range of traditional tracking algorithms for this purpose. Our comprehensive comparative evaluation of these algorithms resulted in a publication. It was a great learning experience for all of us. Building upon this work, my master's thesis transitioned to the development of a deep learning-based model for precise cell tracking. I am currently refining the architecture of this model, integrating advanced techniques to further enhance its accuracy and overall performance in tracking cellular dynamics within complex datasets."



Preparing for Master Thesis Internships: the M2 experience (Cohort 2023-25)

An update of learning paths and projects developed during their third semester

At University Jean Monnet (UJM), M2 students in **Photonics & Machine Learning** had the opportunity to take part in the Industrial days and also got the chance to attend the Manutech Event, where some of them presented their summer internship works. Christeena, an M2 student from this track shared her experience:

"During my third semester, the courses on Micro-Nanophotonics and Electromagnetic Modeling of Micro-Nano-Structured Surfaces gave me the fundamental knowledge to research light-matter interaction at subwavelength scale. Nanoplasmonics and Laser Processing courses helped me grasp laser-material structuring techniques, particularly spatial-temporal pulse shaping, better, which helped in managing light propagation through complex media. These skills are being used directly in my master's thesis on induced modulation instability in gas-filled hollow-core fibers. Group projects, including an industrial research internship, developed my ability to synthesize theoretical concepts with experimental setups. Together, UJM's interdisciplinary training prepared me to tackle challenges in nonlinear photonics, from algorithm development to experimental validation, laying a robust foundation for advanced research in optics."

At **Politecnico di Torino (PoliTo)** for their third semester, with the specialization track of **Nanotechnologies for ICTs, students** also had a fruitful semester which prepared them for careers in nanotechnology. Sohaib, an M2 student shared his experience:

"I had the opportunity to deepen my knowledge in nanotechnology through a diverse range of courses. These courses provided both a strong theoretical foundation covering topics like Solid State Physics and Electronic Devices and practical skills through subjects such as Nanosurface Synthesis and Applications and Materials Characterization. The intensive curriculum not only strengthened my understanding but also prepared me for the challenges ahead in the nanotechnology industry. Beyond the classroom, I gained hands-on experience in lab sessions and had the opportunity to visit Trustech Srl, a company with an advanced cleanroom facility. Trustech collaborates closely with PoliTo's Department of Applied Science and Technology (DISAT), engaging in research, consulting, teaching, and training activities in micro- and nanotechnologies. This semester was an invaluable step toward launching a career in nanotechnology."

Strengthening iPSRS: Outreach and Strategic Development

Engaging Future Students and Enhancing Industry Collaboration for a Thriving Program

Four Info Sessions
To attract Applicants for the 2025 Intake

As part of our ongoing efforts to promote the Erasmus Mundus Joint Master's (EMJM) in Intelligent Photonics for Security, Reliability, Sustainability, and Safety (iPSRS), we successfully organized four virtual information sessions (webinars) to engage prospective students for the 2025 intake.
These sessions provided a comprehensive overview of the iPSRS program, covering key aspects such as curriculum structure, mobility pathways, available scholarships, and career opportunities. Participants had the opportunity to interact with program representatives, professors, and current students to gain first-hand insights into the unique learning experience offered by iPSRS.
Held in Nigeria (two events), Peru (for Latin America) and Turkiye, the webinars reached a diverse audience of aspiring candidates from around the world. The interactive format allowed attendees to ask questions after the presentation and better understand how iPSRS can shape their future careers in photonics and AI.
Thanks to the iPSRS professors and students who contributed to these sessions and our project coordinator who helped organise these.

External Advisory Board (EAB) Meeting

We successfully hosted our first External Advisory Board (EAB) meeting in November 2024, marking a significant step in strengthening industry and academic collaboration. The meeting was held virtually, bringing together distinguished experts from academia, industry, and research institutions to provide strategic guidance and insights for the continuous development of the iPSRS program. The 'Academic and Management Board (AMB) members also joined this meeting. The meeting was hosted by our project coordinator.

The EAB plays a crucial role in ensuring that iPSRS remains aligned with evolving industry needs and technological advancements. Discussions focused on curriculum alignment, industry collaboration, program sustainability, and future initiatives to ensure iPSRS stays at the forefront of photonics and AI. Board members provided valuable insights to strengthen industry partnerships, enhance student opportunities, and shape the program's long-term vision.

We thank all EAB members for their contributions and look forward to the next EAB meeting in the middle of 2025.

Hiding in Clear Sight to Secure

Interview with Christophe Bousquet, Product Group and R&D Director - Physical Documents Security at Thales DIS

Interview by: Ahmed

What are the different divisions that THALES work on?

Thales work in many sectors. Namely, Space, Defense, Secure Communication, Land and Air, as well as Digital Identity and Security. As for Internationals who are willing to apply for Thales, it might be complicated to get into the sectors that are more related to governement security such as Defense, and Space. However there are a huge diversity and people from many different nationalities that work on other projects especially in the Digital Identity and Security field which is the main focus of iPSRS students.

Are the equipements used to develop security features accessible to the general population?

Digital security is like a moving target, you can never find an absolute solution and be compeletely confident that it will be safe forever. Our goal always is to keep up to date, make it as complex as possible to copy, and to reduce fraud. However we can never guarantee a feature that can never be copied. All equipements and tools used could be accessible to frauds sooner or later, and if there is a tool that is not yet accessible to the general population, it will be at a point in time. Thus we always aim at changing the security features incrementaly, comlicate it as much as possible to frauds, and keep them away from the tools as long as possible.

How is having tranparencies in the documents enhance the security?

Transparencies are not the security feature but the tool we use to add complex security features. By having transparencies in let's say a ID card, we are able to inject information between the transparent material rather than have it printed on one of the sides. That is a very complex operation, and thus frauding such documents is quite hard but as always not impossible. Having those kinds of transparencies can help us add two images for example that each show using a different angle of light, and many more features that we can introduce using this powerful "transparency" tool.

Do you have access to the data you are trying to protect?

Typically no. Citizen data are kept encrypted in secure database. Chip programming is encrypted end-to-end to avoid "spying" attack.

Funding Resources for iPSRS Master's Students and Partnerships with EMJM and Manutech SLEIGHT Scholarships

Written by: Sweta

Are you considering enrolling in the iPSRS Master's programme?
We are pleased to inform you about the exceptional funding opportunities available to support your academic journey. Funding from the European Union for the Erasmus Mundus Scholarship and our partnerships with the Manutech-SLEIGHT Graduate School offer substantial financial support to attract outstanding European and international students.

Erasmus Mundus Scholarships

The Erasmus Mundus Scholarship (aka EMJM Scholarship), funded by the European Union (EU), aim to assist Joint Master Degree programmes such as iPSRS in attracting top-tier talent from across the world. These scholarships are exceptionally generous, covering all expenses associated with the two-year PSRS programme. This includes tuition fees, travel costs, and subsistence allowances, thereby allowing you to focus entirely on your studies and research.

Manutech-SLEIGHT Graduate School Scholarships

The Manutech-SLEIGHT Graduate School is dedicated to attracting the most talented students to its distinctive master's programmes. To achieve this, they offer attractive scholarships to exceptional candidates who wish to enrol in one of their master's tracks, which includes iPSRS.

Recipients of the Manutech-SLEIGHT scholarships will have the opportunity to actively engage in the life of the Graduate School and its scientific activities. They will participate in SLEIGHT Science Events and work towards earning the prestigious Manutech-SLEIGHT Certificate, significantly enhancing their training and future career prospects.

Outgoing Mobility Grants

In addition to the scholarships mentioned above, the Manutech-SLEIGHT Graduate School also offers outgoing mobility grants to promote the mobility of M1 and M2 master's students during their internships. These grants are specifically designed to support students enrolled at UJM in semester 3 and cannot be combined with EMJMD scholarships.

Don't miss these amazing funding opportunities to support your Master's studies in iPSRS. Whether you're an aspiring researcher or looking to boost your career in social sciences, these scholarships offer the financial support you need to reach your academic goals. So, if you're ready to take your Master's studies to the next level, we've got the funding to help make it happen. Come join us at PSRS, and let's make some academic magic together!

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Co-funded by
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Follow us to learn more

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www.master-photonics4security.eu

Some of our students

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