



SPM2.0

The newsletter of the Marie Curie Skłodowska
European Training Network SPM2.0

SPM2.0 Recent Highlights

4th Network Meeting, Linz (AUSTRIA), 30th - 1st January 2020

The SPM2.0 team got together at JKU/KEYSIGHT facilities in the beautiful Austrian town of Linz the 30th - 1st January 2020. The main purpose of the meeting was to review the progress evolution of the project and to meet the whole SPM2.0 family composed of the Early Stage Researchers (ESR), Principal Investigators and Supervisors, and Project Manager.

The coordinator presented an overview of the project and project evolution, including general info, recruitment, training, boards, financial reporting, secondments, dissemination and communication actions, assessment commissions, deliverables and milestones alignment and next meetings and doubts. Then, each ESR fellows presented her/his work done during the first 36 months of the project and the corresponding future plans.

Finally, the Assessment Commissions meet each fellow to assess on an individual basis the ESR research project evolution and his/her integration within the host institution and the network. The Assessment Commissions are composed of three PIs or Supervisors belonging to beneficiaries other than the host institution, with different expertise and background.



SPM2.0 intends
to...

SPM2.0 aims to consolidate Europe as the world leader in Scanning Probe Microscopy technologies and its emerging applications in key sectors like materials, microelectronics, biology and medicine.

The researchers of the network will acquire a solid state-of-the-art multidisciplinary scientific training in this field of research, covering from basic science to industrial applications, which should enable them to generate new scientific knowledge of the highest impact. In addition, they will receive a practical training on transferable skills in order to increase their employability perspectives and to qualify them to access to responsibility job positions in the private and public sectors.



Training Workshop 5, Linz (AUSTRIA), 28th-30th January 2020

The fifth Training Workshop took place at the JKU Life Science Center, in Linz (Austria) coinciding with the fourth network meeting. This event was organized and hosted by Dr. Ferry Kienberger (KEYSIGHT) and 13 ESRs of the Network participated.

The courses offered were:

C8. Emerging applications of SPM2.0 technologies to Biology. *The course covered the more promising areas of application of the novel SPM2.0 technologies in the Life Sciences sector. An overview of results already achieved with these novel technologies, together with emerging areas of applications were given: Overview on SPM2.0 techniques for Biology, High-speed AFM imaging for Biology, Molecular recognition force spectroscopy applied to Biology and Medicine, High-resolution nanoscale mechanical mapping applied to Biology, Nanoscale electrical mapping applied to Biology.*

C9. Emerging applications of SPM2.0 technologies in materials science. *The course covered the more promising areas of application of the SPM2.0 technologies in the Material Science sector. An overview of results already achieved, together with emerging areas of applications were given during the course: Fundamentals of organic electronics and sensing, Organic Bioelectronics and neuroelectronics, Organic biosensors, Applications of SPM advanced modes to Organic Electronics (SPL and template growth) and Biosensors (Force Spectroscopy).*

N7. Project raising and management. *The course, done by Biz-Up - Edith Greindl from Business Upper Austria – OÖ Wirtschaftsagentur GmbH, covered the different ways to get funds to develop research, including the different levels of funding (local, national, European, international) and types of funding (fellowships, grants, coordinated actions, etc.).*

Training Workshop 6, On-line (due to COVID19 situation), 10th-12nd June 2020

The sixth Training Workshop took place on-line due to COVID19 situation. The event was organized by Prof. Rainer Hillenbrand and Dr. Monika Goikoetxea (NANO GUNE) and all 14 ESRs of the Network participated.

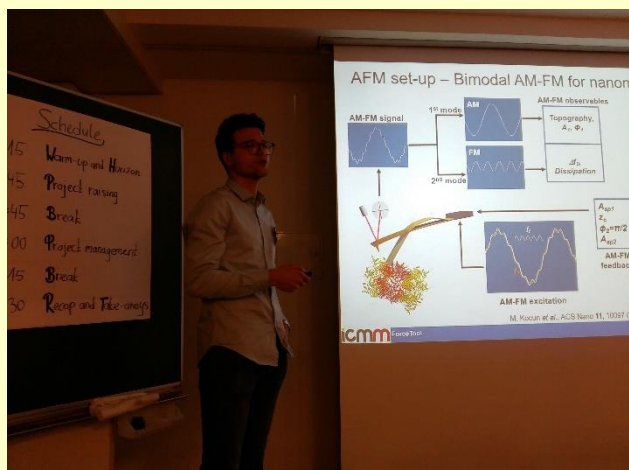
The courses offered were:

C10: Emerging applications of SPM2.0 technologies in Microelectronics. *This course provided an overview of the potential applications of SPM2.0 technologies in the microelectronic industry, particularly focusing on 3D tomographic doping profiling needs and imaging of 3D stacked nanostructures.*

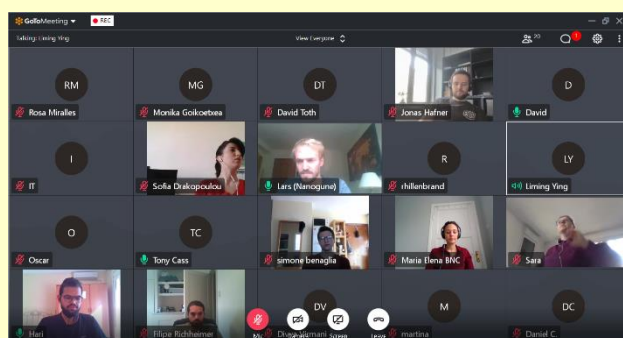
C11: Emerging applications of SPM2.0 technologies in Medicine. *This course provided an overview of the potential applications of SPM2.0 technologies in Medicine, particularly focusing on 3D tomographic imaging needs to monitor nanoparticle drug delivery processes and nanotoxicology evaluation. In particular, Biomedical optical imaging: fluorescence microscopy, Nanotherapeutics, The PowderJect Story: Lessons Learned on the Journey to Commercialization.*

N8: Employment strategies in the private and public sectors. *This course was focused on the main aspects analysed by private companies when selecting researchers. The practical implementation of the course included the personalized design of an employment plan for each of the ESR of the Network. Particular cases and examples from the SPM sectors were given.*

Training Workshop 5



Training Workshop 6



Deliverables and Milestones completed within the third year (M37-M48)

Management Deliverables

- D9.8. SPM2.0 virtual lab. (IBEC).
- D9.10. Application Notes (1st). (KEYSIGHT).
- D8.13. Personal Employability Plans (14). (KEYSIGHT).
- D8.14. Network wide courses minutes (Training Workshop 6). (NANO GUNE).
- D9.11. Application Notes (2nd). (NPL).
- D9.12. Application Notes (3rd). (CSIC).
- D9.13. Network meeting minutes (Final Meeting). (IBEC).
- D9.14. Network Newsletters (4th). (BNC).
- D9.15. Final Management, economic and scientific reports. (IBEC).
- D9.16. Scientific publications and presentations. (IBEC).

RTD Deliverables

- D5.1. 2D nanocomposition mapping of polymers/biomolecules. (CSIC).
- D5.2. Subsurface mapping of nanoparticles in polymers. (NANO GUNE).
- D5.3. Nanocomposition optimization in organic electronic devices. (UNIMORE).
- D5.4. 3D doping profiling of semiconductor devices. (KEYSIGHT).
- D6.1. High speed mapping of single proteins. (JKU).
- D6.2. Label free imaging of nanoparticle cell uptake. (BNC).
- D6.3. Sub-10 nm label free biomembrane composition mapping. (IBEC).
- D6.4. Single protein mutation by HS-AFM. (INSERM).
- D7.2. Tip-sample interaction area. (NPL).

Milestones

- MS11. 10 nm polymer composition mapping (CSIC).
- MS12. Label free nanoparticle imaging. (BNC).
- MS13. Cantilever calibration for HSAFM. (NPL).

SPM2.0 Publications during the third year (M37-M48)

- Jose Hernández-Muñoz, Manuel R. Uhlir, **Simone Benaglia (ESR5, ICMM)**, Enrique Chacón, Pedro Tarazona, **Ricardo Garcia (ICMM)**. [Subnanometer interfacial forces in three-dimensional atomic force microscopy: Water and octane near a mica surface](#). Journal of Physical Chemistry C, 124 (48): 26296-26303 (2020).
- **Sara Rombouts (ESR4, INSERM)**, Marcelo Nollmann. [RNA imaging in bacteria](#). FEMS Microbiology Reviews, Corrected proof. (2020). <https://hal.archives-ouvertes.fr/hal-02991916v1>
- **Martina Di Muzio (ESR1, IBEC)**, Ruben Millan-Solsona, Jordi H. Borrell, Laura Fumagalli, **Gabriel Gomila (IBEC)**. [Cholesterol effect on the specific capacitance of submicrometric DOPC bilayer patches measured by in-liquid scanning dielectric microscopy](#). Langmuir, 36: 12963-12972 (2020).
- **David Toth (ESR10, KEYSIGHT)**, Bekele Hailegnaw, **Filipe Richheimer (ESR9, NPL)**, **Fernando A. Castro (NPL)**, **Ferry Kienberger (KEYSIGHT)**, Markus C. Scharber, **Sebastian Wood (NPL)**, **Georg Gramse (KEYSIGHT)**. [Nanoscale charge accumulation and its effect on carrier dynamics in tri-cation perovskite structure](#). ACS Applied Materials & Interfaces, 12: 48057-48066 (2020).
- **Lars Mester (ESR8, NANO GUNE)**, Alexander. A. Govyadinov, Shu Chen, Monika Goikoetxea, **Rainer Hillenbrand (NANO GUNE)**. [Subsurface chemical nanoidentification by nano-FTIR spectroscopy](#). Nature Communications, 11: 3359 (2020).
- **Oscar Saavedra (ESR3, INSERM)**, Thales F. D. Fernandes, **Pierre-Emmanuel Milhiet (INSERM)**, Luca Costa. [Compression, rupture and puncture of model membranes at the molecular scale](#). Langmuir, 36 (21): 5709-5716 (2020).
- Thales F. D. Fernandes, **Oscar Saavedra (ESR3, INSERM)**, Emmanuel Margeat, **Pierre-Emmanuel Milhiet (INSERM)**, Luca Costa. [Synchronous, crosstalk-free correlative AFM and confocal microscopies/spectroscopies](#). Scientific Reports, 10: 7098 (2020).

Future Actions: Final Reporting for the European Commission, PhD Defenses, SPM2.0 Linked In "alive".