UNIVERSITÀ DEGLI STUDI FIRENZE
Scuola di Scienze Matematiche Fisiche e Naturali

AGENCE ERASMUS+ FRANCE · EDUCATION & FORMATION
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Prof ANNE VARENNE

Institute of Chemistry for Life and Health Sciences, UMR CNRS 8060, Chimie ParisTech

20-24 July 2023

Miniaturized diagnostics developments for health and environment

LECTURE TOPICS

20.07.2023 - Lesson 1

9 am -12 – New affinity ligands and functional nanomaterials in analytical chemistry and molecular diagnosticsLesson

21.07.2023 - Lesson 2

9am -12 – Miniaturized electrokinetic methodologies : Designing tools and systems for biomedical diagnosisLesson 4 – We need a team and funding

24.07.2023 - Lesson 3

2 -5 pm – Microchip design for health and environment

Lesson 4

– Circular economy and chemistry

Prof.ssa Anna Maria Papini
Coordinatore del Dottorato

Prof.ssa Anna Maria Papini
Organizzatore

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Course program and objectives

The courses will present some investigations in the domain of diagnostic developments for health and environment in microfluidic formats. Final opening conference on the link between chemistry and the ecological transition. Students will be able to analyze and criticize an article about miniaturized diagnostics and will be able to extract important outcomes and propose innovative perspectives. That will lead to a deep understanding of the design and development of a miniaturized diagnostics, going from molecular and biological tools, to the overall analytical process. Notions on microlfuidics will be also acquired.

•LOCATION: **aula 39** Blocco aule, via Gilberto Bernardini 1, Sesto Fiorentino

Join online: **20.07.2023** https://unifirenze.webex.com/unifirenze/j.php?MTID=m4b1bf683950ac978e5eefa61d1306b31
21.07.2023 https://unifirenze.webex.com/unifirenze/j.php?MTID=m25c46e192f0273b36b9b6e74dc9cc52c
24.07.2023 https://unifirenze.webex.com/unifirenze/j.php?MTID=m60a4c56c61eb6b1b31612e3ce160d738

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Suggested reading

L. Trapiella Alfonso, T. Pons, N. Lequeux, L. Leleu, J. Grimaldi, M. Tasso, E. Oujagir, J. Seguin, F. D'Orlyé, C. Girard, BT Doan, A. Varenne. Clickable-zwitterionic co-polymer capped- quantum dots for in vivo fluorescence tumor imaging. ACS Appl. Mater. Interfaces (2018) 10, 17107-17116 (DOI : 10.1021/acsami.8b04708)

J. Gouyon, F. d'Orlyé, C. Simon, S. Griveau, C. Sella, L. Thouin, F. Bedioui, A. Varenne. Reversible microfluidics device for precious metal electrodeposition and depletion yield studies. Electrochimica acta (2020) 352, 136474 (DOI: 10.1016/j.electacta.2020.136474-)

B. De Castro Costa, S. Griveau, F. D'Orlyé, F. Bedioui, JA Fracassi da Silva, A. Varenne. Microchip Electrophoresis and Electrochemical Detection: a Review on a Growing Synergistic Implementation. Electrochimica Acta (2021), 391, 138928 (DOI: 10.1016/j.electacta.2021.138928)

A. Varenne. Cooperation increases between analytical sciences and recycling. Tracs, Trends in Analytical Chemistry (2013) 48, 22-29 (DOI: 10.1016/j.trac.2013.04.007)

Prof.ssa Anna Maria Papini
Coordinatore del Dottorato

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Organizzatore

Anne Varenne is a chemistry professor at the Institute of Chemistry for Life and Health Sciences, UMR CNRS, Chimie ParisTech

Research interests

Separation sciences, analytical methodology developments and technologies. Hyphenation of capillary electrophoresis to detection techniques (fluorescence, mass spectrometry, electrochemistry)

Characterization of nanostructures and nanoplatforms, biological systems and specific noncovalent complexes for their interests in electrokinetic separation methods, diagnostics, imaging and therapy. Design of miniaturised total analysis systems (microfluidics, paper-PAD...) for environment and health. Eco-design and recycling

Positions

2009 - now Professor, Chimie ParisTech PSL (France)

1994 - 2009 Associate Professor, Chimie ParisTech PSL

1997 Postdoctoral research associate, CSIC, Madrid (Spain)

2019-now Head of the SEISAD Lab (https://iclehs.fr/research/seisad/)

2018-now Director of the Graduate Program in Chemistry of University Paris Sciences and Letters PSL (15 labs, 200 researchers, 200 PhDs, 100 master students (htpps://psl/eu/programmes-gradues/programme-gradue-chimie)

2016-2018 Deputy Dean of Education of University Paris Sciences and Letters PSL (4500 students)

2016-2018 Director of the pluridisciplinary bachelor CPES PSL (350 students)

2009-2015 Deputy Director of Chimie ParisTech PSL (Dean of Education-500 students)

2015-2022 President of ECOS-Nord France-Mexico, Colombia, Peru and Venezuela scientific programs (Ministry of Foreign Affairs and Ministry of Investigation)

Selection of the 10 most relevant publications and/or patents

1. B. Teste, F. Mallogi, J-M Siaugue, A. Varenne, F. Kanoufi, S. Descroix. Microchip integrating magnetic nanoparticles for allergy diagnosis. Lab on Chip (2011) 11, 4207-4213 (DOI: 10.1039/C1LC20809H)

2. . Girardot, F. D'Orlyé, S. Descroix, A. Varenne. Aptamer-conjugated nanoparticles : preservation of targeting functionality demonstrated by microchip electrophoresis in frontal mode. Anal. Biochem (2013) 435, 150-152 (DOI: 10.1016/j.ab.2012.12.022)

3. .L.Trapiella-Alfonso, G. Ramirez-Garcia, F. d'Orlyé, A. Varenne. Electrokinetic methodologies for the characterization of nanoparticles and the evaluation of their behaviour in biological systems. Tracs, Trends in Analytical Chemistry (2016) 84, 121-130. Invited review (DOI: 10.1016/j.trac.2016.04.022)

4. G. Ramírez-García, S. Gutiérrez-Granados, M-A Gallegos-Corona, L. Palma-Tirado, F. D'Orlyé, A. Varenne, N. Mignet, C. Richard, M. Martinez-Alfaro. Long-term toxicological effects of persistent luminescence nanoparticles after intravenous injection in mice. International Journal of Pharmaceutics (2017) 532, 686-695 (DOI: 10.1016/j.ijpharm.2017.07.015)

5. G. Duarte-Junior, A. Ismail, S. Griveau, F. d'Orlyé, J-A Fracassi da Silva, W. Coltro , F. Bedioui, A. Varenne. Integrated microfluidic device for the separation, decomposition and detection of low molecular weight S-nitrosothiols. Analyst (2019)144, 180-185 (DOI: 10.1039/C8AN00757H)

6. J. Gouyon, F. d'Orlyé, S. Griveau, F. Bedioui, A.Varenne*. Characterization of home-made graphite/PDMS microband electrodes for amperometric detection in an original reusable glass-NOA®-PDMS electrophoretic microdevice. Electrochimica Acta (2020) 135164 (DOI: 10.1016/j.electacta.2019.135164)

7. J. Gouyon, F. d'Orlyé, C. Simon, S. Griveau, C. Sella, L. Thouin, F. Bedioui, A. Varenne. Reversible microfluidics device for precious metal electrodeposition and depletion yield studies. Electrochimica Acta (2020) 352, 136474 (DOI: 10.1016/j.electacta.2020.136474)

8. B. De Castro Costa, S. Griveau, F. Bedioui, F. D'Orlyé, JA Fracassi da Silva*, A. Varenne. Stereolithography based 3D-printed microfluidic device with integrated electrochemical detection. Electrochimica Acta (2022), 407, 139888 (DOI 10.1016/j.electacta.2022.139888)

9. F. Espinola-Portilla, F. dOrlye, L. Trapiella-Alfonso, S. Gutierrez-Granados, G. Ramirez-Garcia*, A. Varenne . Rational Understanding of Loading and Release of Doxorubicin by UV-Light- and pH-Responsive Poly(NIPAM-co-SPMA) Micelle-like Aggregates. Molecular Pharmaceutics (2023) 20, 3 1490-1499 (DOI : 10.1021/acs.molpharmaceut.2c00690)- Invited cover (DOI : 10.1021/acs.molpharmaceut.2c00690)

10. H. Silva-Neto, G. Duarte-Junior, D. Rocha, F. Bedioui, A. Varenne, W. Coltro. Recycling 3D printed residues for the development of disposable paper-based electrochemical sensor. ACS Applied Materials & Interfaces (just accepted) (DOI : 10.1021/acsami.3c00370)