

Ange Maurice

POST-DOCTORAL RESEARCHER

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Research interests: *Microfluidics, Energy Storage, Prototyping, Characterisation, Materials science, Sustainable solutions*

Research and work experience

Nanyang Technological University, SCARCE Laboratory(Postdoc)

Singapore

DEVELOPMENT, MAINTENANCE AND EXPERIMENTATION WITH A FULLY AUTOMATED MICROFLUIDIC

2018-2021

PLATFORM FOR LIQUID-LIQUID EXTRACTION STUDIES[1, 2, 8]

- Liquid-liquid extraction of metals and rare earths using synergistic extractant mixtures and deep eutectic solvents
- On-line X-ray fluorescence apparatus/measurements of metals
- On-line FTIR measurement of solvent chemical activity
- Hardware design of microfluidic chips
- Python programming for remote control of apparatus

BUILDING AN AUTOMATED PROTOTYPE FOR SORTING WASTE PRINTED CIRCUIT BOARD (WPCB)

COMPONENTS[3]

- X-ray absorption spectroscopy for recognition of PCB components based on their chemical composition
- Image recognition of PCB components using deep learning: Convolutional neural networks
- Fully working prototype with sorting rate 3 kg/hr

Nanyang Technological University (PhD)

Singapore

ELECTRICAL BREAKDOWN OF GRAPHENE TRANSISTORS[4]

2014-2018

- Study of the physical mechanism
- Spatial control of the crack propagation using femtosecond laser annealing

SETTING UP A FEMTOSECOND LASER OPTICAL APPARATUS

- Implementation of power control, imaging system, sample holder.
- LabView programming

DEFECT ENGINEERING BY FEMTOSECOND LASER ANNEALING[6, 7]

- Gallium nitride and hexagonal boron nitride: Single-photon and tunable light sources
- Graphene and Molybdenum disulphide: Gas sensors, electrical breakdown control

NON-VOLATILE GRAPHENE MEMORIES BASED ON ELECTRICAL BREAKDOWN[9, 10]

- Study of the switching mechanism, new electro-mechanical switching model
- Optimisation of the memory (ON/OFF ratio, switching speed, endurance)

University of Rochester (Visiting PhD scholar)

Rochester, USA

HYBRID CARBON HETERO-STRUCTURES FOR ADVANCED THERMAL INTERFACE IN 3D INTERCONNECTS[5]

Feb-Aug. 2016

- COMSOL electro-thermal simulation of carbon interconnects

École Polytechnique (Visiting PhD scholar)

Palaiseau, France

IN-SITU INFRARED THERMOGRAPHY OF GRAPHENE TRANSISTORS[4]

Oct-Dec. 2017

- Real-time observation of the thermal dissipation in graphene transistors
- COMSOL electro-thermal simulation of graphene transistors

SAINT-GOBAIN Research Centre

Aubervilliers, France

RESEARCH INTERNSHIP: STUDY OF OPTICAL THIN FILMS ON GLASS

Feb-Aug. 2014: 6 months

THALES Angénieux

St Héand, France

ENGINEERING INTERNSHIP: STUDYING RESIDUAL STRESSES IN WROUGHT ALUMINIUM

Jun-Sep. 2013: 3 months

SOITEC

Bernin, France

INTERNSHIP: R&D PROJECT, IMPROVING EFFICIENCY OF A SOLAR CELL

Jul-Aug. 2012, 2 months

University of the West of Scotland

Paisley, Scotland

RESEARCH INTERNSHIP: OCEANOGRAPHIC PROJECT ON ACOUSTIC BUBBLE SIZING

Apr-Jun. 2011, 3 months

Education

Nanyang Technological University/CNRS-International-NTU-THALES Research Alliance

Singapore

DOCTOR OF PHILOSOPHY (PHD): SCHOOL OF ELECTRICAL & ELECTRONIC ENGINEERING

2014-2018

"Thermal failure analysis of carbon nanostructures" Supervised by Beng Kang Tay

Institut National des Sciences Appliquées (INSA)

Lyon, France

MASTER'S DEGREE : MATERIALS SCIENCE AND ENGINEERING

2011-2014

Dublin City University (DCU)

Dublin, Ireland

ACADEMIC EXCHANGE: SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING

Sep. 2013-Jan. 2014

Institut Universitaire de Technologie (IUT)

Montpellier, France

TWO-YEARS UNIVERSITY DIPLOMA (DUT) IN THE MESURES PHYSIQUES (INSTRUMENTATION AND MEASUREMENT) DEPARTMENT

2009-2011

Specialty: Materials science

Lycée Jean Monnet

Montpellier, France

BACCALAURÉAT S (MATHEMATICS, PHYSICS, CHEMISTRY, BIOLOGY)

2009

Skills

Programming Python, VBA, MATLAB/Scilab, Labview, LaTeX

Softwares COMSOL, Ansys, Blender, Microsoft Office, CAD drawing

Operating systems Linux, Windows, Mac OS

Languages French: Native speaker, English: Fluent, Spanish: Intermediate, Chinese: Basic

Experimental **Characterization:** Atomic Force Microscope, Raman spectroscopy, Scanning Electron microscope, X-Ray scattering, X-ray Fluorescence, X-ray absorption, Electrical micro-probing, FTIR spectroscopy
Micro-fabrication: Spin coating, UV Photolithography, Mask design, Lift-Off, Plasma etching
Deposition: Magnetron sputtering, Filtered Cathodic Vacuum Arc, Electron-beam evaporation
Microfluidics: Chip design and fabrication, on-line characterisation, 3D printing

Teaching

Nanyang Technological University

Singapore

LABORATORY CLASSES: 150 HOURS

2016-2018

- Labview Programming, signal processing, acquisition
- Operational amplifier, circuit logic

Articles and conferences

Journal papers

- [1] Ange A. Maurice, Johannes Theisen, Varun Rai, Fabien Olivier, Asmae El Maangar, Jean Duhamet, Thomas Zemb, Jean-Christophe P. Gabriel **First online X-ray fluorescence characterization of liquid-liquid extraction in microfluidics** *Nano-Select*, 2021 DOI:10.1002/nano.202100133
- [2] Ange Maurice, Johannes Theisen, Jean-Christophe P. Gabriel **Microfluidic lab-on-chip advances for liquid-liquid extraction process studies** *Current Opinion in Colloid & Interface Science*, 2020 DOI:10.1016/j.cocis.2020.03.001
- [3] Ange Maurice, Khang Ngoc Dinh, Nicolas Charpentier, Andrea Brambilla, Jean-Christophe P. Gabriel **Dismantling of Printed Circuit Boards Enabling Electronic Component Sorting and treatment: A Strategy for Maximizing Elemental Recovery using Hydrometallurgy** *Under peer reviewing at Processes, MDPI*, 2021
- [4] Ange Maurice, Laurence Bodelot, Beng Kang Tay, and Bérengère Lebental **Controlled, low-temperature nanogap propagation in graphene using femtosecond laser patterning.** *SMALL*, 2018 DOI:10.1002/smll.201801348
- [5] Boris Vaisband, Ange Maurice, Chong Wei Tan, Beng Kang Tay, and Eby G Friedman. **Electrical and thermal models of CNT TSV and graphite interface.** *IEEE Transactions on Electron Devices*, 65(5):1880–1886, 2018. DOI:10.1109/TED.2018.2812761
- [6] Songyan Hou, Muhammad Danang Birowosuto, Saleem Umar, Ange Maurice, Roland Yingjie Tay, Philippe Coquet, Beng Kang Tay, Hong Wang, and Edwin Hang Tong Teo. **Localized emission from laser-irradiated defects in 2D hexagonal boron nitride.** *2D Materials*, 5(1):015010, 2017. DOI:10.1088/2053-1583/aa8e61

- [7] Umar Saleem, Muhammad Danang Birowosuto, Songyan Hou, Ange Maurice, Tay Beng Kang, Edwin Hang Tong Teo, Maria Tchernycheva, Noelle Gogneau, and Hong Wang. **Light emission from localised point defects induced in GaN crystal by femtosecond-pulsed laser** *Optical Materials Express*, 2018

Conferences

- [8] Ange A. Maurice, Johannes Theisen, Varun Rai, Fabien Olivier, Asmae El Maangar, Jean Duhamet, Thomas Zemb, Jean-Christophe P. Gabriel **On-Line Microfluidics XRF and FTIR Spectroscopy for Fast Exploration of Liquid/Liquid Extraction Thermodynamics** In *Virtual MRS Spring Meeting, Poster Presentation*, Materials Research Society, 2021.
- [9] *Loïc Loisel, Ange Maurice, Bérengère Lebental, Stefano Vezzoli, Costel-Sorin Cojocaru, and Beng Kang Tay. **A graphene-based non-volatile memory**. In *Carbon Nanotubes, Graphene, and Emerging 2D Materials for Electronic and Photonic Devices VIII, Oral Presentation*, volume 9552, page 95520R. International Society for Optics and Photonics, 2015. DOI:10.1117/12.2188110
- [10] *Loïc Loisel, Ange Maurice, Bérengère Lebental, Stefano Vezzoli, Costel-Sorin Cojocaru, and Beng Kang Tay. **A Non-volatile Memory Based on Disordered Graphene** In *SPIE Nanoscience and Engineering 2, Oral Presentation*, 2015 HAL-ID: hal-01798526

*Ange Maurice is not the presenter

Extracurricular Activities

COMMUNITY INVOLVEMENT

- Badminton coach assistant certificate
- Organisation: Badminton University Tournaments

INTERESTS

- Badminton, Squash
- Climbing, Hiking
- Cycling, Sailing
- Chess

References

Jean-Christophe Gabriel (Postdoc Supervisor)
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