Brice LE BORGNE

Curriculum vitae

✍ Advanced Technology Institute
University of Surrey, Guildford, Surrey
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Work experience

Nov. 2017 – Present

ATI, Univ. Surrey, UK

Postdoctoral researcher

Development and conception of inkjet printed electronics on paper. This project is supported by UK's EPSCR Next generation paper and involves various research teams from the University of Surrey.

Sept. 2017 – Oct. 2017

IETR - MM Department, France

Postdoctoral researcher

Development — from conception to fabrication — of biochemical sensors functionalized with carbon nanotubes. This project is supported by french ANR PlasBioSens and involves 4 research team : GREMI (Orlans, France), INEM (Orleans, France), IMN (Nantes, France) and IETR (Rennes, France). Contribution to 3D electronics fabrication using "Water Transfer Printing".

Sept. 2016 – Aug. 2017

ISTIC/IETR - MM Department, France

Research and Teaching Assistant

Teacher at ISTIC Engineer School, mainly in analog and digital electronics.

Development of an original transfer method to develop "Water Transfer Printing" technique. The main objective of this technique was to enable integration of electronics on daily-life objects using additive fabrication.

Oct. 2013 – Nov. 2016

IETR - MM Department, France

PhD Student

Teacher at ISTIC Engineer School and IUT de Rennes (GEII Department), in analog/digital electronics and power electronics.

Development and fabrication of chemical sensors based on nano-objects for lead detection. The thesis is entitled "Chemical microsensors based on polycrystalline silicon layers at nanoscale : application to lead detection". The aim of this work was to implement a lead ions sensor based on polycrystalline silicon nanostructures. This study showed that structures such as polysilicon nanoribbons or nanowires have poor crystalline quality but satisfying enough electrical properties to be used as a sensor sensible elements. Nanoribbons have been functionnalized by spontaneous grafting of diazonium salts that enable lead ions trapping at the surface of these nanoribbons. Thanks to the functionnalization, sensor reached a low limit detection. Development of a gate-all-around transistor based on polycrystalline silicon nanowires was also proposed. It could lead to increase sensibility of that type of microsensors.

Public projects

2017-2018 **EPSCR Next generation paper (link)**
Printed electronics on paper

2017 **ANR PlasBioSens (link)**
Biochemical sensors development

Education

2012 – 2013 **Mechatronics and Mechanical Engineering**
MASTER
Univ. Rennes 1, Rennes

2011 – 2012 **Teaching Electronics**
MASTER
Ecole Normale Supérieure (ENS), Cachan

2011 – 2012 **Electronics – Telecom.**
1st YEAR MASTER
ENS & Univ. Rennes 1, Rennes

2011 – 2012 **Mechanical Engineering**
1st YEAR MASTER
ENS & Univ. Rennes 1, Rennes

Communication skills

FRENCH Native speaker

ENGLISH Advanced english level

Special skills

CLEAN ROOM Photolithography, LPCVD, APCVD, PECVD for silicon, Si_3N_4, SiO_2, Inkjet printing, Transistors fabrication on paper, plastics and flexible substrates

CHARACTERIZATION Electrical test, Ellipsometry, SEM observation, Profilometry

OTHERS Cadence software, Origin, UNIX

Publication

- B. Le Borgne, O. De Sagazan, E. Jacques, S. Crand, M. Harnois. Conformal Electronics Wrapped Around Daily-life Objects Using Original Method: Water Transfer Printing. *ACS Applied Materials and Interfaces* (2017).
- B. Le Borgne, L. Pichon, M. Thomas, A.-C. Salan. Reduced bulk and surface states densities in metal induced crystallized polycristalline silicon nanowires. *Physica Status Solidi A*, vol. 213, No. 11, pp. 2890-2894 (2016).
- B. Le Borgne, A.-C. Salaun, L. Pichon. Electrical properties of self-aligned gate-all-around polycristalline silicon nanowires field-effect transistors. *Microelectronics Engineering*, vol. 150, pp. 32-38 (2016).
- R. Rogel, B. Le Borgne, T. Mohammed-Brahim, E. Jacques, M. Harnois. Spontaneous buckling of multiaxially flexible and stretchable interconnects using PDMS/fibrous composite substrates. *Advanced Materials Interfaces* (2017).
- L. Donero, N. Bouts, A.A. El Mel, B. Le Borgne, E. Gautron, L. Le Brizoual, F. Le Bihan, P.-Y. Tessier. Effect of temperature on the synthesis of nanoporous carbon from copper/carbon thin films to nanoporous carbon for sensing applications. *Thin Solid Films* (2016).

Communications

- **Oral** — B. Le Borgne, A.-C. Salan, L. Pichon, F. Geneste. Resistors based on polycrystalline silicon nanoribbons for lead ions detection, *European Materials Research Society (EMRS) Spring Meeting 2016, Symposium O*, du 3 au 6 mai 2016, Lille (France).
- **Oral** — L. Pichon, B. Le Borgne, A.-C. Salan, R. Rogel, F. Geneste. Silicon 3D nanostructures for highly sensitive chemical sensors, *Nano and MicroSystems (NAMIS) Workshop*, du 4 au 6 juillet 2016, Enschede (Pays-Bas).
- **Poster** — B. Le Borgne, A.-C. Salan, L. Pichon. Dual-gate transistors based on polycrystalline silicon nanowires, *European Materials Research Society (EMRS) Spring Meeting 2016, Symposium O*, du 3 au 6 mai 2016, Lille (France).
- **Poster** — B. Le Borgne, M. Thomas, A.-C. Salan, R. Rogel, L. Pichon. Electrical characterization of Si nanostructures/SiO_2 interfaces by field-effect conductance method, *European Materials Research Society (EMRS) Fall Meeting 2015, Symposium P*, du 15 au 18 septembre 2015, Varsovie (Pologne).
- **Poster** — B. Le Borgne, A.-C. Salan, F. Geneste, L. Pichon. Fabrication and characterization of functionnalized nanostructures for lead detection sensor, *Nano and MicroSystems*

(NAMIS) International Summer School 2015, du 29 juin au 3 juillet 2015, Montral (Canada).

- **Poster** — Journes Nationales du Rseau Doctoral en Microlectronique (JNRDM) 2014, du 26 au 28 mai 2014, Lille (France).

TEACHING

- **2016-2017** : **ATER** - UFR Info.- Elec. (ISTIC) - UR1
  Master's Degree - Electronics and Telecom. : Students' projects supervision.
  M1 - Electronics and Telecom. : Analog circuits (Amplifiers, etc.).
  L1, L2 - Electronics and Telecom. : Digital circuits.
  Bachelor's Degree Electronics and Telecom. : Physics of semiconductors
  L1 MIEE : Office tools (LibreOffice).

- **2015-2016** : **PhD** - IUT de Rennes (GEII) - UR1
  1st year of DUT : Power electronics (conversion, transport...) and office tools.

- **2013-2015** : **PhD** - UFR Info.- Elec. - UR1
  M1 - Electronics and Telecom. : Students' projects supervision.
  M1 - Electronics and Telecom. : Analog circuits (Amplifiers, etc.).
  L1, L2, L3 - Electronics and Telecom. : Digital circuits.
  Bachelor's Degree Electronics and Telecom. : Physics of semiconductors

REMARKS

Feel free to contact me for more details.