Dr. Abdelmalek Benkouider

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Professional Summary

Highly motivated and dedicated researcher possessing solid background in nanotechnology and semiconductor devices. Skilled in achieving high level of accuracy and problem solving, utilizing exceptional analytical abilities, and commitment to hard work.

Core Qualifications and Skill Areas

- Comprehensive knowledge of semiconductor materials, techniques and products with extensive experience in system design, fabrication, characterisation and testing for complex micro and nano fabrication processes development and integration.
- Over 6 years of class 100 and class 1000 cleanrooms hands–on experience for semiconductor fabrication processes (molecular beam epitaxy, e–beam evaporation, plasma reactive magnetron sputtering, chemical vapor deposition, lithography, focused ion beam, rapid thermal processing, dry/wet etching, etc.), and analytical instruments (TEM, SEM, EDX, AFM, surface profiler, Hall effect measurement etc.).
- In-depth knowledge of microelectronic equipment, tools, and maintenance procedures.
- Strong background knowledge in semiconductor physics, photovoltaic, micro– / nano–electronic and memory devices;
- Excellent analytical and communication skills, fast learning, handling multiple tasks skills and work efficiently in a team environment.

Professional Experiences

Research Fellow – Nanotechnology Expert — Nov. 2016 to present
Nanofabrication Centre — Southampton, United Kingdom
Electronics & Computer Science
University of Southampton
Activity: *The project provides a breakthrough in the devices that can be fabricated in the fields of phase change memory, thermoelectric and infra–red detectors, by delivering a disruptive combination of feature size, device complexity, and materials quality, through advanced electrodeposition of semiconducting materials.*

- *Design and nano–fabricate templates for materials characterisation, and sub 20* nm *array structures using e–beam lithography or helium ion beam for functional proof–of–principle device operation.*
- *Undertake characterisation of electro–deposited materials and devices using electrical measurements on ensembles of elements and scanned probe measurements on individual elements.*
- *Lithographic process development in a class 100 cleanroom environment.*
- *Novel scalable design for the fabrication of electro–deposited crossbar memory arrays at the nanometre scale.*
- *Coordinate and collaborate with members involved in the project.*
- *Report and publish relevant results to national and international journals and conferences.*

Supervisors: Kees de Groot, Prof.

Research and Development Engineer — Sept. 2015 to Nov. 2016
TESCAN ORSAY HOLDING, a.s. — Brno, Czech Republic
R&D Physics Department
Activity: *My work mainly focuses on scanning electron microscopes (SEM), focused ion beam (FIB) and dual beam FIB–SEM instruments combined with other analysis and nano–fabrication tools.*

- *Collaborate with TESCAN engineering, R&D, and product management on product improvements and issues.*
- *Perform demonstrations, operator training, and sample evaluations on e–beam and FIB tools and provide application support to customers.*
- *Develop new applications in cooperation with the Applications Department and coordinate with other R&D teams.*
- *Coordinate and validate models predicting single and overlapped footprints on various target materials for FIB machining.*
- *Study the effect of ion doses during the FIB processing and create new delayering strategies using Xe plasma FIB for failure analysis and semiconductor applications.*

Supervisors: Jaroslav Jiruše, Ph.D and Tomáš Hrnčíř, Ph.D.

Research and Development Engineer Mar. to Apr. 2016
Orsay Physics Fuveau, France
TESCAN ORSAY FRANCE
Activity: *I worked with Orsay Physics' R&D team as an invited researcher on the development of a new configuration for the FIB Ga LMIS to improve its stability and insure long–time emission.*

- *Performed direct observations on the stability behavior of previous state–of–the–art LMIS and profiled different particle experiments.*
- *Designed and tested new Ga LMIS for their implementation in nanofabrication technologies, in particular focused ion beams, as well as other applications.*
- *Maintained daily contact with my direct supervisors for technical issues to communicate goals, experiments progress and maximize performance.*

Supervisor: Anne Delobbe, Ph.D.

Graduate Research Assistant Oct. 2012 to Sept. 2015
Institut Matériaux Microélectronique Nanosciences de Provence Marseille, France
Aix-Marseille University
Epitaxial Semiconductor Nanostructures Team.
Activity: *The main objective of this work was to develop a bottom–up and a top–down –based process for the elaboration and the characterization of SiGe nanostructures. The work was founded on different theoretical and experimental studies covering focused ion beam, molecular beam epitaxy and other nanotechnology tools.*

- *Conducted an extensive bibliography research, analysed the information, identified the solutions and reported results.*
- *Upgraded experimental setup for the elaboration and analysis of semiconductor nanostructures.*
- *Mentored and supervised undergraduate students in experimental research projects over several semesters, and assisted them in preparation of proposals and papers.*
- *Interacted daily with the team members to synchronize completion of projects.*
- *Published scientific papers in national and international journals.*

Supervisors: Isabelle Berbezier, Ph.D and Antoine Ronda, Eng.

Junior Researcher Mar. to Aug. 2012
Institut Matériaux Microélectronique Nanosciences de Provence Marseille, France
Epitaxial Semiconductor Nanostructures Team
Activity: *Fabrication of ordered network of Au droplets by heterogeneous dewetting of Au layers and selective chemical deposition on nanopatterned Si substrate.*

- *Maintained experiments and reported results to the research coordinator and conducted tests to validate solutions.*
- *Captured related information and research (articles, reports and books) and documented the outcome of this work in presentations and reports.*
- *Actively participated in the team meetings.*

Supervisor: Luc Favre, Ph.D.

Research Internship Apr. to Aug. 2011
Centre National de la Recherche Scientifique Marseille, France
University of Provence
Epitaxial Semiconductor Nanostructures Team
Activity: *Deterministic fabrication of core–shell SiGe nanowires via molecular beam epitaxy growth and Ge condensation using the rapid thermal oxidation.*
Supervisor: Antoine Ronda, Eng.

Undergraduate Research Assistant Jan. to July 2010
University of Blida Blida, Algeria
LAboratoire de Traitement de Signal et Imagerie (LATSI)
Activity: *Study and fabrication of an opto–electromechanical device for retina's light–excitation and development of controlling software using Visual Basic and Matlab®.*
Supervisor: Bougherira Hamida, Prof.

Education

Aix-Marseille University Marseille, France

- Ph.D, Condensed Matter Physics and Nanosciences Oct. 2015
  Thesis Topic: *Fabrication and Characterization of SiGe–based Core–Shell Nanostructures.*
- M.Sc., Nanoelectronic Devices Sept. 2012
  Topic: *This branch ensures in particular an advanced training to the fabrication, development, characterisation, and simulation tools of nano–materials and ultimate devices used for micro and nano–electronics.*

University of Provence Marseille, France

- M.S., MINELEC: MIcro and Nano ELECtronics Aug. 2011
  Topic: *The main objectives of the master of science & technology entitled "Microelectronics & Nano–electronics" (MINELEC) is to insure: (i) a high level of teaching, (ii) an initiation to the scientific research and (iii) an integration into the professional fields of micro– and nano–electronics and nano–technologies.*

University of Blida Blida, Algeria

- Eng., Electronics July 2010
  Topic: *Complete teaching and training program in the field of electronics in general and controlling systems in particular.*
- DEUG. (*Two–year University Degree*), Sciences, Technologies & Computing July 2007
  Topic: *These two-year formation presents a general overview and initiation to the main high–tech fields such as computing and technology sciences.*

Research Experiences

Undergraduate & Graduate Works. Due to their unique physical and chemical properties, semiconductor nanostructures (thin films, quantum wires and quantum dots) have been proposed as promising building blocks for novel nano– and optoelectronic devices. Several theoretical investigations predict that nanowires (NWs) could display extraordinary optical properties. Relevant macroscopic collective properties require perfect size homogeneity and ordering control. In the specific case of quantum-wires, various processes have been developed to obtain large density of ultra–small NWs and the most efficient and versatile approach is the preferential growth on AuSi catalysts.

In this context, my Ph.D thesis and previous works were dedicated to the development of new processes for the self–assembly of Si–based nano–objects. My studies have been shared in four main activities:

- **Substrate Nanostructuring via Liquid Metal Alloy Source Focused Ion Beam**
  In this work we study the influence of the major focused ion beam (FIB) operating parameters: ion chemical species, beam current, lens voltage and ion dose on the ultimate nanopatterning resolution. We propose a two–step process based on first ion milling of a SiO_2 sacrificial layer and second SiO_2 chemical etching for the fabrication of nanopatterns with ultimate size-density and *Ad libitum* shape. Examples of resulting patterns are presented. The morphological evolution of FIB patterns is quantitatively measured by atomic force microscope (AFM) in–air under non tapping mode.

  Ref. *A. Benkouider et al., Thin Solid Films 543 (2013) 69.*

- **Fabrication of AuSi Catalysts Ordered Networks**
  $Au_{0.8}Si_{0.2}$ nanocatalysts (NCs) are synthesized via homogeneous dewetting of thin Au layers evaporated on Si substrate during thermal annealing in ultra–high vacuum. In a first part, the mechanism of dewetting is analysed as a function of the Au deposited thickness (h). We distinguish three different dewetting regimes: (i) for low thickness ($h \leq$0.4 nm) a coverage by a sub–mono–layer of Au is stable and there is no dewetting, (ii) for intermediate thickness (0.4 nm$< h \leq$ 5 nm) there is both dewetting and phase transformation into $Au_{0.8}Si_{0.2}$ clusters. The clusters size and density is directly related to h. When cooling down to room temperature, they decompose and reject the Si at the Si substrate / Au cluster interface; (iii) high thickness ($h >$ 5 nm) there is only dewetting without formation of AuSi clusters. In this regime, the dewetting is kinetically controlled by the self–diffusion of Au (activation energy $\sim$ 0.43 eV) without effect of Si–alloying. As a consequence, when relying solely on the kinetic dewetting to form the AuSi clusters, it is only in the second regime where the $Au_{0.8}Si_{0.2}$ clusters with a good size and density control can be produced.

  We then develop a process for the pinning of $Au_{0.8}Si_{0.2}$ catalysts using FIB assisted dewetting (heterogeneous dewetting). We show that whatever the FIB milling conditions and the Au nominal thickness are, the $Au_{0.8}Si_{0.2}$ droplets preferentially form on the patterned areas while in the same conditions, they are not observed on the unpatterned areas. Such behavior is attributed to the larger Au−Si inter–diffusion in the patterned areas which results from the Si–bond breaking induced by the ion irradiation. A systematic analysis of the nanodroplets position evidences their preferential nucleation inside the patterns while a thicker almost pure Au dewetted layer is observed between the patterns.

  Ref. *A. Benkouider et al., Nanotechnology 26 (2015) 505602.*

- **Focused Ion Beam Assisted Heterogeneous Dewetting**
  In this work, we investigated complete and partial dewetting of thin Si films on silicon oxide (SOI substrates). By patterning the 2D silicon layer before dewetting (i.e. by e–beam lithography and reactive ion etching (RIE) or by focused ion beam), we demonstrate the control of final size, shape, density and spacing of the NCs. Patterning has a strong impact in determining the final shape and in–plane asymmetry of the dewetted 3D islands: etching long stripes oriented parallel or diagonal with respect to the crystallographic directions induces the formation of highly symmetric or largely asymmetric NCs. Finally, we show that the combined use of patterning and partial dewetting is a suitable method for controlling the exact position of individual dewetted 3D islands sitting on a partially dewetted 2D layer of crystalline silicon.

  Ref. *M. Abbarchi et al., ACS Nano. 8 (2014) 11181–11190.*

- **Physical Characterization of Nanostructures**
  In this work we develop a FIB based process for the insulation of nanostructures and their local electrical contact for I(V) measurements. We also perform photo–luminescence (PL) analysis of nanostructures depending on their size, geometry, density and chemical composition.

  Ref. *D. J. Lockwood et al., Beilstein Journal of Nanotechnology 5 (2014) 2498–2504.*

Marie–Curie Initial Training Network Works. In my Marie Curie Post Doc in Brno (Czech Republic) and Fuveau (France) at TESCAN ORSAY HOLDING, a.s. and ORSAY PHYSICS I changed the topic of research: I moved from the fundamental research on SiGe based nanostructures to a larger application research and development related to scanning electron microscopy, focused ion beam and dual beam FIB–SEM systems.

- **Marie–Curie ITN**
  The overall aim of the Marie–Curie ITN was to establish a transnational research and training platform on energy beam (EB) processing methods (laser abrasive, water–jet machining and focused ion beam milling) which together represent a scientific field of critical importance for further advancement of high value–added manufacturing industry. Whilst these processes differ in nature, a set of key commonalities can be identified among them when considered as dwell–time dependent processes, this allows the approach of EB processes under a unitary technology umbrella. The key element that brings all the EB processing methods together is a unifying modeling platform of the footprints. I worked on the development of original methods to calibrate the generic footprint models for the ion beam milling and the validation of the modeling approach on FIB. I also participate on the implementation the beam path simulator on real workstations to generate micro, meso, macro and free–forms using the ion beam.

- **Focused Ion Beam Development**
  In the second part of the Marie–Curie ITN project I spent a long secondment at ORSAY PHYSICS, where I was working on the development of new commercial Ga liquid metal ion source (LMIS) for FIB instruments. The work was divided into two main topics, the first one was to develop new strategies and procedure for starting and operating the Ga LMIS, while the second part was based on improving the old design of the sources and developing a completely new LMIS architecture. These results represents leading edge research in fundamental physics and optics of charged particles.

  Moreover, some of my works at TESCAN ORSAY HOLDING were also based on the development of emerging Xe plasma FIB systems which promise faster removal rates. We show that the new Xe plasma FIB offers sputtering speed up to 50 times faster than the most powerful Ga FIB. Compared to conventional Ga ion sources, the Xe plasma ion source reduces dramatically the time for cross–sectioning from tens of hours or even days to a matter of hours. Furthermore, combining this plasma FIB column with an UHR–SEM column expands even more the advantages for such a tool by opening possibilities of ultra–fast 3D tomography, large TEM lamella preparation, failure analysis and surface preparation. The UHR–SEM sample observations during the milling process offers imaging of the resulting cross–section and EDX or EBSD analysis, all being integrated in the same instrument, thus enabling the creation of complex automated tasks.

  Finally, we created new strategy for failure analysis on an integrated circuit using a rocking stage with 6–axes piezo movement capabilities together with the novel approach of the combined Xe–plasma ion source FIB and SEM system. Site–specific milling of copper with different milling strategies were tested to optimize time and homogeneity of the milling across the target surface and to overcome the channeling effect posed by polycrystalline copper. Only during the last few nanometers of copper layer the water vapor were used to protect the dielectric layer. The complete removal of copper was followed with XeF_2 assisted milling of the dielectric layer to observe the unharmed circuitry. Channeling effect was reduced by regulating the sputtering rates across different grains keeping the underlying dielectric layer safe.

  Ref. *A. Benkouider et al., European Microscopy Congress (2016) 398.*

ADEPT - Advanced Devices by ElectroPlaTing Project Works. The full potential of thermoelectric, phase change memory and IR sensor devices is held back by the inability to deposit functional materials with the required quality, component size, complexity and control. Previous work shows that electrodeposition from weakly coordinating solvents can deliver practical device structures combining these features. This is the vision of the ADEPT EPSRC programme grant led by leading researchers at the Universities of Southampton, Nottingham and Warwick.

- **Fabrication and Characterisation of Sub 20 nm Structures**
  The design and nano–fabrication of templates for materials characterisation, and sub 20 nm array structures using e–beam lithography (EBL) or helium ion beam for functional proof–of–principle device operation. Moreover, Undertake characterisation of electro–deposited material and devices using electrical measurements on ensembles of elements and scanned probe measurements on individual elements. A state–of–the art cleanroom facilities of the Zepler Institute are used for this project.

- **Phase Change Memory**
  Phase change memory has been actively researched by large multinational electronics companies (IBM, Samsung, Micron). However, the switching energies and cycle stability of current devices means that phase change memory is only used in niche applications. There is considerable literature on why sub–5 nm phase change elements overcome these limitations, however, no current deposition technology exists which can produce such structures. In this project, we will deliver this unique capability to open up possibilities to realize completely new computer architectures

including exciting opportunities emerging in interfacial phase change memory, memristors and even neuromorphic computing.

Teaching Experience

Graduate and undergraduate student training 2012 – 2015

During the years of my Ph.D I had the opportunity to collaborate with several M.Sc and Ph.D students. I contributed to the training and teaching of these students in several aspects of physics, SiGe–based nanostructures, semiconductor physics and nanosciences.

Trained undergraduate students

Topics: *SiGe nanostructures, photovoltaics, micro– and nanoelectronics, core–shell nanowires.*

- Epitaxial Semiconductor Nanostructures Team, IM2NP-CNRS, France
  - *M. Labrot*: Nanocrystals' metrology in memories devices. 2012
  - *A. Moufak*: SiGe Oxidation and condensation process. 2013
  - *A. Ilhami*: Electrical properties of SiGe ore–shell nanowires. 2014
- Faculty of Technology, University of Blida, Algeria
  - *A. Yahoui & N. Yahoui*: Fabrication and characterization of SiGe core–shell nanowires. 2015

Trained PhD students 2013 – 2015

Topics: *SiGe nanostructures, fabrication, characterization and analysis tools, nanosciences, condensed matter physics, nanomaterials.*

- Epitaxial Semiconductor Nanostructures Team, IM2NP-CNRS, France
  - *M. Nafouti*: Deterministic fabrication of Si and SiGe–based nanostructures via solid state dewetting of thin silicon fillm on insulator.
  - *K. Liu*: Study of silicon (Ge) core-shell nanowires.

Co–instructor 2011 – 2015

8h PW – Workshop of Continuing Training Autumn 2011

Use and applications development of liquid metal alloy ion source focused ion beam (LMAIS-FIB) nanopatterning and atomic force microscopy (AFM) roughness analysis.
Epitaxial Semiconductor Nanostructures Team
CNRS, France

25h PW – M.S. Advanced Materials for Nanosciences and Energy Springs 2011 – 2012

Introduction on *Top–down* and *Bottom-up* elaboration of SiGe–based nanostructures.
Epitaxial Semiconductor Nanostructures Team
IM2NP-CNRS, France

18h PW – Microelectronics Engineering Spring 2013

Getting started with focused ion beam column and using scanning electron microscope with nanostructures.
École Centrale Marseille
IM2NP-CNRS, France

12h PW – B.S. Physics and Chemistry Winter 2014

Laboratory practical demonstration and training of electrokinetics.
Faculty of Sciences
Aix-Marseille University, France

Technical Expertise and Skills

Nanostructures and Device Fabrication

Hands–on experience in a broad spectrum of device processing equipment in cleanroom environment including ultra–high vacuum (UHV) systems.

- Materials Growth and Deposition: Epitaxial Si and SiGe growth using RIBER 32 molecular beam epitaxy system, deposited metal and dielectric thin films using Leybold Helios Pro XL plasma assisted reactive magnetron sputter, plasma–enhanced chemical vapor deposition of amorphous Si, polycrystalline Si, SiGe, oxide and nitride using OPT Plasmalab System 100 PECVD and metal evaporations using Leybold e-beam LAB 700 EB and LAB 600 EB evaporators.
- Focused Ion Beam: Skilful at several FIB and DualBeam FIB/SEM systems, including FEI Helios NanoLab 650, conventional TESCAN Ga FIB stations, XEIA and FERA Xe plasma TESCAN FIB, LMAIS–ExB filtered FIB and Zeiss ORION NanoFab He FIB.
- Annealing and Rapid Thermal Processing: Si oxidation and other clean processes using Tempress Oxidation Furnaces, thermal annealing for metallic contacts, rapid thermal wet and dry oxidation and SiGe condensation using Jipelec Jetfirst 200.
- E–beam Lithography: Design patterns on various semiconductor and dielectric substrates using JEOL JBX–9300FS system for processes using PMMA and ZEP resists.

- Photolithography: Mask layout design using L-edit and Layout Editor software, spin coating thin or thick negative and positive photoresists and mask alignment using EVG 620TB double–side aligner.
- Etching: Dry reactive ion etching using Oxford Instrument Plasmalab 80 Plus RIE and wet etching using buffered oxide etch (BOE) for SiO_2, KOH for Si and metal etchant.

Materials Characterisation and Metrology

Years of hands–on experience in materials characterization and measurement using various tools.

- Transmission Electron Microscopy: Skilful at TEM sample preparation using mechanical polishing or FIB and advanced experience with TEM/STEM microscopes especially FEI Tecnai G2.
- Scanning Electron Microscopes: Conventional, high-resolution and environmental SEM using TESCAN, Philips and JEOL microscopes with UHR images and EDX analysis.
- Chemical Analysis Spectroscopy: Analysed samples in electron-energy-loss spectroscopy (EELS) and energy dispersive X-ray (EDX) techniques using wide range of microscopes including FEI Tecnai G2 TEM/STEM, TESCAN, JEOL JSM 7500F FESEM and Philips XL 30 SEM.
- Probe Microscopy: Profilometer using KLA Tencor P–16 Stylus Profiler and atomic force microscopy with contact, non–contact and tapping modes for in–air AFM using PSIA VE–100 and Veeco Multi–Mode NanoScope.
- Electrical and Optical Characterisation: Hall effect measurement using Nanometrics HL5500PC with liquid nitrogen cryostat stage, I–V analysis, and conventional photo–luminescence spectroscopy.

Computer Skills

- Programming: Python, C/C++, Fortran, Bash, Visual Basic, LaTeX, PHP, HTML/CSS, JS, also basic ability with: Assembly, VHDL.
- Tools: Microsoft Office Suite, L–Edit, OriginLab, Matlab, Gnuplot, SRIM, ImajeJ, Inkscape, Visual Studio, COMSOL (Beginner).
- Platforms: Linux, Microsoft Windows, Mac OS.

Natural Languages

- Arabic and French: bilingual.
- English: Fluent.
- Czech: Beginner.

Refereed Journal Publications

1. **A. Benkouider**, I. Berbezier, A. Ronda, L. Favre, E. Gomes–Ruiz, I.C. Marcus, I. Alonso, A. Delobbe and P. Sudraud, "Ultimate nanopatterning of Si substrate using filtered liquid metal alloy ion source–focused ion beam", *Thin Solid Films*, 543 (2013) 69–73.

2. E. Ruiz–Gomes, C. Herrier, A. Gouyé, **A. Benkouider**, P. Sudraud, A. Delobbe, A. Ronda and I. Berbezier, "Electroless selective deposition of gold nano–array for silicon nanowires growth" *Nanofabrication*, 1 (2013) 1–7.

3. **A. Benkouider**, A. Ronda, A. Gouyé, C. Herrier, L. Favre, D.J. Lockwood, N.L. Rowell, A. Delobbe, P. Sudraud and I. Berbezier, "Selective growth and ordering of SiGe nanowires for band gap engineering", *Nanotechnology*, 25 (2014) 335303.

4. M. Abbarchi, M. Naffouti, B. Vial, **A. Benkouider**, L. Lermusiaux, L. Favre, A. Ronda, S. Bidault, I. Berbezier and N. Bonod, "Wafer Scale Formation of Monocrystalline Silicon–Based Mie Resonators via Silicon–on–Insulator Dewetting", *ACS Nano*, 8 (2014) 11181-–11190.

5. D.J. Lockwood, N.L. Rowell, **A. Benkouider**, A. Ronda, L. Favre and I. Berbezier, "Bright photoluminescence from ordered arrays of SiGe nanowires grown on Si (111)", *Beilstein journal of nanotechnology*, 5 (2014) 2498–2504.

6. K. Kacha, F. Djeffal, H. Ferhati, **A. Benkouider** and I. Berbezier, "Multi–trench–based technique to improve amorphous SiGe thin–film solar cell performance" *Sciences and Techniques of Automatic Control and Computer Engineering (STA) IEEE*, (2014) 765–769.

7. J.N. Aqua, L. Favre, A. Ronda, **A. Benkouider** and I. Berbezier, "Configurable compliant substrates for SiGe nanomembrane fabrication", *Crystal Growth & Design*, 15 (2015) 3399–3406.

8. T. David, **A. Benkouider**, J.N. Aqua, M. Cabie, L. Favre, T. Neisius, M. Abbarchi, M. Naffouti, A. Ronda, K. Liu and I. Berbezier, "Kinetics and Energetics of Ge Condensation in SiGe Oxidation", *The Journal of Physical Chemistry C*, 43 (2015) 24606–24613.

9. A. Aissata, M. Ghomrani, W. Bellil, **A. Benkouider** and J.P. Vilcot, "The doping effect on the properties of zinc oxide (ZnO) thin layers for photovoltaic applications", *International Journal of Hydrogen Energy*, (2015).

10. F.Z. Ghomrani, A. Aissat, H. Arbouz and **A. Benkouider**, "Al Concentration Effect on ZnO Based Thin Films: For Photovoltaic Applications", *Energy Procedia*, 74 (2015) 491–498.

11. **A. Benkouider**, A. Ronda, T. David, L. Favre, M. Abbarchi, M. Naffouti, J. Osmond, A. Delobbe, P. Sudraud and I. Berbezier, "Ordered arrays of Au catalysts by FIB assisted heterogeneous dewetting", *Nanotechnology*, 26 (2015) 505602.

12. M. Naffouti, T. David, **A. Benkouider**, L. Favre, A. Ronda, I. Berbezier, S. Bidault, N. Bonod and M. Abbarchi, "Fabrication of poly–crystalline Si–based Mie resonators via amorphous Si on SiO_2 dewetting", *Nanoscale*, 8 (2016) 2844–2849.

13. A. Benahmed, A. Aissat, **A. Benkouider** and J.P. Vilcot "Modeling and simulation of InAs/GaAs Quantum dots for solar cell applications", *Optik–International Journal for Light and Electron Optics*, 127 (2016) 3531–3534.

14. M. Naffouti, T. David, **A. Benkouider**, L. Favre, M. Cabie, A. Ronda, I. Berbezier and M. Abbarchi, "Fabrication of core–shell nanostructures via silicon on insulator dewetting and germanium condensation: towards a strain tuning method for SiGe–based heterostructures in a three dimensional geometry", *Nanotechnology*, 27 (2016) 305602.

15. M. Naffouti, T. David, **A. Benkouider**, L. Favre, A. Delobbe, A. Ronda, I. Berbezier and M. Abbarchi, "Templated Solid–State Dewetting of Thin Silicon Films ", *Small* (2016), 12 (44), 6115–6123.

16. T. David, K. Liu, S. Fernandez, M.I. Richard, A. Ronda, L. Favre, M. Abbarchi, **A. Benkouider**, J.N. Aqua, M. Peters, P. Voorhees, O. Thomas, and I. Berbezier, "Remarkable Strength Characteristics of Defect–Free SiGe/Si Heterostructures Obtained by Ge Condensation", *J. Phys. Chem. C* (2016), 120 (36), pp 20333–20340.

Submitted Journal Publications

1. **A. Benkouider**, S. Sharang, T. Hrnčíř, J. V. Oboňa, J. Jiruše and E. Principe, "Ultrafast nano-fabrication using Xe–plasma FIB–SEM and its Cu milling applications using the Rocking-stage", (2016), *in press.*

2. M. Naffouti, R. Backofen, M. Salvalaglio, T. Bottein, M. Lodari, A. Voigt, T. David, **A. Benkouider**, I. Fraj, L. Favre, A. Ronda, I. Berbezier, D. Grosso, M. Abbarchi, and M. Bollani , "Complex dewetting scenarios of ultra–thin silicon films for large–scale nano–architectures", *Advanced Materials*, (2017), *submitted.*

Invited and Conference Presentations

International Meetings

- Journée Boites Quantiques, JBQ2013, Paris, France — June 2013
  Auto–assembly of Ge quantum dots on nanostructured substrate

- International Workshop Si and Photonics, INSA Rennes, France — June 2013
  Self-organisation of semiconductor nanostructures

- NANOS3, Airlie Beach, Queensland, Australia — Sept. 2013
  SI/GE nanostructures

- EMRS, Spring meeting, Lille, France — May 2014
  Selective Growth and Ordering of SiGe Nanowires for Band Gap Engineering

- International Conference on Physics of Light—Matter Coupling — June 2014
  in Nanostructures PLMCN, Montpellier, France
  Ultra–large arrays of silicon-based Mie resonators: fabrication and optical properties

- NANOSEA 2014, Marseille, France — July 2014
  Ordered arrays of gold catalysts by focused ion beam assisted dewetting

- ICPAM 10, Iasi, Romania — Sept. 2014
  SiGe superstructures towards light emision

- MADICA, Sousse, Tunisia — Nov. 2014
  The strain energy into the SiGe nanostructures: towards light emission

- EMRS, Spring meeting, Lille, France — May 2015
  Fabrication and optical properties of ultra–large arrays of silicon–based Mie resonators

- EMRS, Spring meeting, Lille, France — May 2015
  Synthesis and composition profiling of $Si_{1-x}Ge_x$ core–shell nanowires

- ICSI, Montréal, Canada — May 2015
  Ordered arrays of SiGe core–shell nanowires: synthesis and properties

- EMAG 2016, Durham, UK — Apr. 2016
  Ultrafast nano–fabrication and analysis using Xe plasma ion FIB–SEM microscope

- EIPBN 2016 Pittsburgh, PA, USA — May 2016
  Ultrafast nano-fabrication using Xe–plasma FIB–SEM and its Cu milling applications using the Rocking–stage

- UKS '17 Sheffield, UK — July 2017
  Fabrication of core–shell nanostructures via silicon on insulator dewetting and germanium condensation

Invited Talks

- Electronics Department, University of Blida, Blida, Algeria — Nov. 2014
  SiGe based nanostrucures: Fabrication and characterization

- Iasi, Romania — Dec. 2014
  SiGe based nanostrucures for the band Gap engineering

Poster Sessions

- EMRS, Spring meeting, Lille, France — May 2014
  Ordered arrays of gold catalysts by focused ion beam assisted dewetting

- NANOSEA 2014, Marseille, France — July 2014
  Fabrication of core-shell structure by condensation of $Si_{1-x}Ge_x$ nanowires

- NANOSEA 2014, Marseille, France — July 2014
  MBE grown SiGe core–shell nanowires for band gap engineering

- NANOSEA 2014, Marseille, France — July 2014
  Anomalous formation of GeO_2/SiO_2 nanowires during thermal oxidation of nanostructured SiGe layers

- EMRS, Spring meeting, Lille, France — May 2015
  Fabrication of large-scale arrays of Si–based nanocrystals via thin film dewetting

- EMAG 2016, Durham, UK — Apr. 2016
  Planar FIB milling of copper by using the novel rocking stage technology

- EMC 2016, Lyon, France — Aug. 2016
  Emerging Xe-plasma focused ion beam and its applications

Honors and Awards

- French Ministry of National Education, Higher Education and Research — 2012 – 2015
  Ph.D. scholarship (60.000,00 €) — France

- Marie Curie Initial Training Network — 2015 – 2016
  Experienced Researcher Fellowship (36.000,00 €) — Czech Republic

References

References are available on request.