XAVIER BAIE, PhD

R&D ENGINEER | SEMICONDUCTORS & ELECTRONICS | eXemi CONSULTANT

Gembloux, Belgium | +32 478 702 802 | Xavier.Baie@eXemi.eu | linkedin.com/in/XavierBaie/

PROFESSIONAL PROFILE

R&D engineer and consultant combining semiconductor physics, materials science, device modelling, power electronics and electronic design. Experienced in turning poorly defined technical questions into practical investigation and development paths by connecting physics, measurements, simulation, components, packaging and PCB behaviour. Autonomous and pragmatic, with international research and industrial experience, cross-functional communication skills, and a strong record of learning new domains when a project requires it. Open to permanent R&D roles and short- or long-term expert assignments through eXemi.

CORE EXPERTISE

- Semiconductor devices: SOI MOSFETs, GaN power devices, device physics, compact and behavioural modelling
- Power electronics: low-power space converters, gate drivers, BLDC drives and multi-kW, kV-class converter architectures
- Modelling and simulation: SPICE, MATLAB/Simulink, finite-element analysis, parasitics, electro-thermal and system-level interpretation
- R&D problem solving: feasibility, root-cause analysis, measurement strategy, design review, technical audit and technology scouting
- Technology bridging: coordination across internal teams, customers, laboratories, universities, suppliers and packaging partners

PROFESSIONAL EXPERIENCE

Founder & R&D Consultant | eXemi | Gembloux, Belgium | May 2025 - Present

- Provide independent support in semiconductor technology, electronics, modelling, simulation and complex R&D problem solving.
- Developed the architecture and initial design of a 220 V / 3 kW AC-AC power-line converter using bidirectional GaN switches.
- Structure technical questions, identify appropriate external expertise and translate multidisciplinary findings into actionable engineering decisions.

Principal Hardware Design Engineer | Navitas Semiconductor | Mont-Saint-Guibert, Belgium | Dec 2022 - Apr 2025

- Investigated silicon die, package and PCB parasitics using finite-element analysis, behavioural device models and electrical simulation; contributed to patent-related R&D.
- Designed and developed a 500 V / 10 A BLDC driver using GaN devices and isolated interfaces for a Safran-funded project.
- Connected device behaviour, package constraints and board-level design to support robust system decisions.

Senior Staff Electronic Design Engineer | COISSOID | Mont-Saint-Guibert, Belgium | Jun 2022 - Nov 2022

- Developed a high-power, high-temperature MOS gate-driver concept for SOI electronics and 600 A / 1,200 V SiC modules.

Electronic Design Engineer | Thales Alenia Space | Leuven / Charleroi, Belgium | Sep 2016 - Feb 2021

- Designed low-power DC-DC conversion for space applications and performed RAMS and FMECA activities.
- Contributed to R&D of an SOI ASIC for space power conversion, from device constraints to circuit-level design choices.

EARLIER EXPERIENCE

Senior Field Application Engineer | e-peas | Mont-Saint-Guibert, Belgium | May 2016 - Aug 2016
Customer support, PCB and demonstration-board design in Altium, product positioning and technical communication.

Business Partner | VDD-Consult | Mont-Saint-Guibert, Belgium | Apr 2015 - Apr 2016
Business development and project ownership from quotation to delivery, including a high-temperature 200 °C DC-DC converter.

Scientific Software Developer & IT Administrator | DSEC | Waterloo, Belgium | Dec 2005 - Aug 2013
Process-flow, energy and mass-balance modelling for industrial sugar production; scientific software development and IT operations.

Teacher & Researcher | IEMN / ISEN | Lille, France | Dec 2001 - Dec 2005
Semiconductor device physics and technology teaching; Silvaco process/device simulation; MATLAB modelling; SOI research; project proposals, patents and student supervision.

Senior Device Designer - SOI Logic Technology | IBM | Fishkill, NY, USA | Jul 2000 - Dec 2001
Member of advanced 125 nm SOI technology teams; investigated mechanical-stress effects on MOSFETs; test-device layout in Cadence; patent contribution.

Researcher / Postdoctoral Researcher | UCLouvain & University of California, Davis | Belgium / USA | Jun 1998 - Jun 2000
Quantum-dot and single-electron devices, clean-room fabrication, cryogenic characterisation to 0.3 K, e-beam system reverse engineering and a 2D finite-element Schrödinger-Poisson solver in MATLAB.

TECHNICAL SKILLS

Semiconductors & materials: SOI CMOS, MOSFET, GaN, microelectronics, clean-room processing, device characterisation, cryogenic measurements | Electronics: power converters, drivers, analogue and mixed-signal interfaces, PCB design, laboratory measurement | Software & tools: MATLAB, Simulink, SPICE, Altium Designer, Silvaco Athena/Atlas, Simplis, Micro-Cap, CAE/FEA, Cadence layout | Methods: R&D planning, requirements, RAMS, FMECA, technical reporting, customer and partner support

EDUCATION & CREDENTIALS

- PhD in Applied Sciences - Semiconductor Physics / SOI MOSFETs | UCLouvain, Belgium | 1998
- MSc in Materials Science Engineering, cum laude | UCLouvain, Belgium | 1993
- Management by Projects | Tubize, Belgium | 2013

PUBLICATIONS, PATENTS & LANGUAGES

23 scientific publications and conference contributions; patent contributions in semiconductor devices and power-electronics R&D. Full list available on request.

Languages: French (native) | English (professional working proficiency)