Antoine **Dupré**

Nuclear Instrumentation Engineer (PhD) · R&D Expert

Address: Maltesergasse 4, 7000 Chur, Switzerland
Date and place of birth: 20/02/1991, Brétigny-sur-Orge (91), France
Citizenship: French

(+33) 752636622 | antoine.dupre@alumni.epfl.ch | www.researchgate.net/profile/Antoine_Dupre

Current Situation

Software and Algorithms Engineer

Landquart, Switzerland

SenTec AG, EIT Branch, Switzerland — *Jul. 2019 - date*

Research and Development of software and algorithms for the EIT lung monitoring system commercialised by SenTec AG.

Education

Ph.D. in Instrumentation (R&D)

Cadarache, France

Ecole Centrale Marseille and Atomic Energy Commission CEA Cadarache, France — *Oct. 2014 - Sep. 2017*

"Electrical Impedance Tomography for Void Fraction Measurements of Harsh Two-phase Flows: Prototype development and Reconstruction techniques", thesis director: S. Bourennane (Institut FRESNEL, Marseille, France), supervisor: G. Ricciardi (CEA Cadarache, France).
PhD defence on October 10th 2017. Comittee: Pr. Prasser (ETH Zürich, Switzerland), Pr. Moldestad (UCSN, Norway), Pr. Mylvaganam (UCSN, Norway), Dr. Rossi (CEA, France), Dr. Bellis (LMA Marseille, France), Dr. Ricciardi (CEA, France), Pr. Bourennane (ECM Marseille, France). [video] [diploma]

M.Sc. in Nuclear Engineering

Lausanne/Zürich, Switzerland

EPFL and ETHZ (Swiss Federal Polytechnic Institutes of Lausanne and Zürich) — *Oct. 2012 - Aug. 2014*

Score: 5.48/6.00 [diploma] [transcript]

B.Sc. in Physics

Lausanne, Switzerland

EPFL (Swiss Federal Polytechnic Institute of Lausanne — *Sep. 2008 - Sep. 2012*

- Propaedeutic (2008-2010), score: 5.32/6.00 [transcript]
- Bachelor I (2010-2011), score: 4.87/6.00 [transcript]
- Bachelor II (2011-2012), ERASMUS exchange with University of Nottingham, UK, score: 81/100 [transcript]

Scientific *Baccalauréat* (Physics)

Gap, France

Lycée Dominique Villars, Gap — *Jun. 2008*

Very Good rating, Score: 16.24/20 [transcript]

Skills

Programming Python, Matlab, C/C++, LaTeX, COMSOL
Languages French (mother tongue), English (advanced), Chinese (notions)

Publications [21]

Articles Under Review [1]

1. T. Becher, A. Dupré et al., "Prolonged continuous monitoring of regional lung function in infants with respiratory failure" *Crit. Care Medecine*, submitted (2020)

Referred Articles [7]

2. M. Darnajou, A. Dupré, C. Dang, G. Ricciardi, S. Bourennane, C. Bellis, S. Mylvaganam, "High Speed EIT with Multifrequency Excitation using FPGA and Response Analysis using FDM", *IEEE Sensors Journal*, Early Access (**2020**).
3. M. Darnajou, A. Dupré, C. Dang, G. Ricciardi, S. Bourennane, C. Bellis, "On the Implementation of Simultaneous Multi-Frequency Excitations and Measurements for Electrical Impedance Tomography", *Sensors*, Volume 19, Issue 17, 3679 (**2019**).
4. A. Dupré, K.M. Lei, P-I Mak, R.P. Martins, W.K. Peng, "Micro- and nanofabrication NMR technologies for point-of-care medical applications – A review", *Microelectronic Engineering*, Volume 209, Issue 15, 66-74 (**2019**).
5. A. Dupré, S. Mylvaganam , "A simultaneous and continuous excitation method for high-speed Electrical Impedance Tomography with reduced transients and noise sensitivity", *Sensors*, Volume 18, Issue 4, 1013 (**2018**).
6. A. Dupré, G. Ricciardi, S. Bourennane, S. Mylvaganam , "Electrical Impedance Based Flow Regimes Identification - Multiphase Experiments and Sensor Modelling", *IEEE Sensors Journal*, Volume 17, Issue 24, pp. 8117-8128 (**2017**)
7. A. Dupré, G. Ricciardi, S. Bourennane, "Novel Approach for Analysis and Design of High-speed Electrical Impedance Tomographic System for Void Fraction Measurements in Fast Two-phase Flows ", *IEEE Sensors Journal*, Volume 17, Issue 14, pp. 4472-4482 (**2017**)

8. A. Dupre, A. Vasiliev, H. Ferroukhi and A. Pautz, "Towards Modeling and Validation Enhancements of the PSI MCNPX Fast Neutron Fluence Computational Scheme based on recent PWR Experimental Data", *Annals of Nuclear Energy*, Volume 85, pp. 820-829 (**2015**)

Conference Papers [9]

9. A. Dupré, M-R Benissa, P.C. Rimensberger et al., "Graphical User Interface for Patient Data Overview of long and continuous EIT monitoring for research analysis", Conference EIT2019, London, United Kingdom (2019)
10. A. Dupré, M-R Benissa, P.C. Rimensberger et al., "Transfer function of regional respiratory system mechanics determined from EIT images during pressure-controlled ventilation", Conference EIT2019, London, United Kingdom (2019)
11. A. Dupre, S. Mylvaganam, "Simultaneous and Continuous Excitation Strategy for High-speed EIT: the ONE-SHOT method" Conference WCIPT9, Bath, United Kingdom (2018)
12. R. Johansen, T.G. Ostby, A. Dupre, S. Mylvaganam, "Long Short-Term Memory (LSTM) Neural Networks For Flow regime identification using ECT" Conference WCIPT9, Bath, United Kingdom (2018)
13. A. Dupre, "Flow regime identification with fast electrical impedance tomography", Conference Bubble and Drops, Lyon, France (2017)
14. A. Dupre, G. Ricciardi, S. Bourennane, "Identification of flow regimes using raw EIT measurements", Conference WCIPT8, Foz do Iguacu, Brazil (2016) [link]
15. A. Dupre, G. Ricciardi, S. Bourennane, "Development of a prototype device for imaging two-phase flows via electrical impedance tomography", Conference SWINTH, Livorno, Italy (2016) [link]
16. A. Dupre, G. Ricciardi, S. Bourennane, "On the feasibility of retrieving phase indicator function of a bubble flow in an electrical impedance tomography experiment", Conference ISPT8, Dresden, Germany (2015) [link]
17. A. Dupre, A. Vasiliev, H. Ferroukhi and A. Pautz, "Validation enhancements of the PSI fast neutron fluence computational scheme using operational PWR experimental data", Student conference of the American Nuclear Society, Pennstate University, USA (2014) [link]

Reports, manuscripts [4]

18. A. Dupré, "Electrical Impedance Tomography for Void Fraction Measurements of Harsh Two- phase Flows: Prototype development and Reconstruction techniques", PhD thesis manuscript, Ecole Centrale Marseille, France (2017) [link]
19. A. Dupre, A. Vasiliev, H. Ferroukhi and A. Pautz, "Extension and validation enhancements of the PSI Fast Neutron Fluence MCNPX based computational scheme using recent KKG experimental data", Master thesis manuscript, Paul Scherrer Institute, Villigen, Switzerland (2014) [link]
20. A. Dupré, "Automation of a Global Variance Reduction tool", M.Sc. Internship report, Centre d'études nucléaires SCK-CEN, Belgium (2013)
21. A. Dupré, "Miniaturised NMR sensor", B.Sc. Internship report, University of Nottingham, United Kingdom (2012) [link]

Invited Talks

- PhD defence, October 10th 2017.
  "Electrical Impedance Tomography for Void Fraction Measurements of Harsh Two-phase Flows: Prototype development and Reconstruction techniques",
  Comittee: Pr. Prasser (ETH Zürich), Pr. Moldestad (UCSN), Pr. Mylvaganam (UCSN), Dr. Rossi (CEA), Dr. Bellis (LMA Marseille), Dr. Ricciardi (CEA), Pr. Bourennane (ECM Marseille).
- Presentation of preliminary Ph.D. results, flagship thesis, members of jury: CEA's high commissioner Yves Bréchet, CEA's scientific councilor and president of the French Society of Physics: Michel Spiro, CEA Cadarache, April 15th 2016
- Internal CEA seminar on CEA's objectives for innovative instrumentation, invitation by CEA's high commissioner Yves Bréchet and CEA-DEN's scientific director Franck Carré, Gif-sur-Yvette, 20-21 June 2016
- Seminar on "Instrumentation for multiphase flows", 2h lecture, invited by Prof. Saba Mylvaganam, University College of Southeast Norway, Porsgrunn, Norway (2016)

Refereeing work (6)

- IEEE sensors journal (1)
- Measurement Science and Technology (4)
- Biomedical Physics & Engineering Express (1)

Teaching and Mentoring Activities

Teaching (110h)

- Student assistant for tutorials in Physics, Prof. Laszlo Forro, 1st year of medical science, EPFL,fall semester 2010-2011 (60h) [attestation]
- Private tutoring in physics, numerical analysis and linear algebra, 1st and 2nd years of B.Sc. (Physics section), EPFL (50h)

Pedagogical mentoring

- Co-supervision of the M.Sc. group project of Rafael Johansen, Torbjørn Grande Østby and Ashiq Pathan (University College of South-East Norway) on "Identification on Flow regimes" at the University College of Southeast Norway, Porsgrunn, Norway (main supervisor : Prof. Mylvaganam) (October-December 2017)
- Supervision of the M.Sc. internship of Geoffroy Debione (Aix-Marseille University) on "Flow regime identification of vertical upward gas-liquid flows with the ProME-T EIT tomograph" at CEA Cadarache, France (February-September 2017)

- Co-supervision of the M.Sc. thesis of Stijn Vyncke (Antwerppen University) on “Flow regime identification of horizontal gas-liquid flows with ECT signal” at the University College of Southeast Norway, Porsgrunn, Norway (supervisor : Prof. Mylvaganam) (February-June 2016)

Work Experience

Post-doctoral Research Fellow — *Geneva, Switzerland*
University Hospital of Geneva (HUG) — *Sep. 2018 - June. 2019*
Data Analysis and Clinical Interpretation of Electrical Impedance Tomography lung monitoring data within the CRADL Horizon 2020 program

Post-doctoral Research Fellow — *Braga, Portugal*
Iberian Nanotechnology Laboratory (INL) — *Jul. 2018 - Aug. 2018*
Design and Literature Review of Micro-NMR systems for point-of-care medical applications

Research Fellow (Ph.D. student) — *Cadarache, France*
Atomic Energy Commission (CEA) Cadarache — *Oct. 2014 - Sep. 2017*
Ph.D. thesis: “Electrical Impedance Tomography for Void Fraction Measurements of Harsh Two-phase Flows: Prototype development and Reconstruction techniques”

Invited researcher — *UCSN, Norway*
University College of Southeast Norway — *Feb. 2016*
Collaboration with Prof. Mylvaganam, “ECT-based flow regime identification of horizontal gas-liquid flows”

M.Sc. thesis and project — *PSI, Switzerland*
STARS group, Paul Scherrer Institute — *Sep. 2013 - Aug. 2014*
”Extension and validation enhancements of the PSI Fast Neutron Fluence MCNPX based computational scheme using recent KKG experimental data”

M.Sc. internship — *SCK-CEN, Belgium*
MYRRHA project, SCK-CEN — *May. 2013 - Aug. 2013*
“Automation of a Global Variance Reduction tool”

B.Sc. internship — *University of Nottingham, UK*
Sir Peter Mansfield Imaging Centre, University of Nottingham — *Feb. 2012 - Jul. 2012*
“Development of a miniaturised NMR sensor”

Treasurer (volunteer) — *CEA Cadarache, France*
ASTHEC Ph.D. association at CEA Cadarache — *Apr. 2015 - Apr. 2016*

Training

1. Teaching Science at University (MOOC), Prof. Niebert, University of Zürich, 15h, [certificate]
2. Digital Signal Processing (MOOC), Profs. Vetterli and Prandoni, EPFL, 80h [certificate]
3. Inverse and Optimisation Methods, Ecole Polytechnique Paris, 16h
4. Thermal Measurements & Inverse Techniques, METTI 6 Spring School, 40h
5. Neural Networks for Machine Learning (MOOC), Prof. Hinton, University of Toronto [certificate]
6. COMSOL Multiphysics intensive course [certificate]
7. HTML, CSS and Javascript for Web Developers (MOOC, in progress)
8. Databases and SQL for Data Science (MOOC, planned)

Awards and Grants

1. Excellent paper award, WCIPT9 conference held by the International Symposium for Industrial Process Tomography, Bath, UK (2018) [certificate]
2. Special funding of the Ph.D. thesis: “thèse phare CEA”: “Measurements of steam-water two-phase flows with electrical impedance tomography” (2014)
3. Best paper award in reactor physics, Student conference of the American Nuclear Society, Pennstate University, USA (2014) [certificate]
4. Merit grants for Very Good rating at the Scientific Baccalauréat(2008)