Jérôme Richy

Ph. D. Engineer – Material Science R&D

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Age 29 – Full driving licence

Education

2012 à nov. 2016 **Ph. D. in Material Science**, *Laboratoire de magnétisme de Bretagne*, university of western Britanny, Brest, France.
Obtained with honorable mention.

Title *Study of the magnetic properties in ferromagnetic/multiferroic nanostructures.*

Supervisors David Spenato, David Dekadjevi

Description During this thesis, I studied the magnetic exchange coupling between permalloy $Ni_{81}Fe_{19}$ and one of the few room temperature multiferroic $BiFeO_3$ grown by radio-frequency sputtering. This research is part of the more global challenge of electrically controllable magnetic devices, for applications like magnetic storage, high frequency emitters, sensors, etc. Structural and magnetic properties were probed by X-ray diffraction (XRD), atomic force microscopy (AFM), transmission electron microscope, azimuthal (VVSM) and low temperature (SQUID) magnetometry. Low temperature measurements has been performed at the university of Johannesburg, South Africa. A thermally dependent magnetic model has been developped and implemented in a Python program, allowing to reproduce experimental results (see DOI).

2009 – 2012 **Ingénieur Civil des Mines – Bachelor's Degree in Engineering Science**, *Mines de Nancy*, Nancy, France.
Specialty: *functional materials.*

Details After a first year with general courses (mathematics, statistics, solid/fluid mechanics, thermodynamics, computing, economics), I specialized during the second year in functional materials (magnetic/dielectric materials, mechanical shear/stress, phase diagram, supraconductivity), including transversal courses like numerical analysis or signal processing.

2011 – 2012 **Master's Degree in Condensed Matter**, *University of Lorraine* , Nancy, France.
Specialty: *physics–plasma–photonic.*

Details Theoritical courses in physics: light–matter interactions, phase transitions and critical phenomena, semiconductors, electronic transport, lasers, electrodynamics, magnetism, large intruments (synchrotron, neutron diffraction).

2007 – 2009 **Preparatory classes**, *St. Louis high school*, Paris, France.
Physics and engineering science (PSI).

2006 – 2007 **Preparatory classes**, *St. Louis high school*, Paris, France.
Mathematics, physics and engineering science (MPSI).

Diplomas

2012 **Ph. D. in Material Science**, *University of Western Brittany*, Brest, France.
Specialty: *dense matter, materials and components.*

2012 **Bachelor's Degree in Engineering Science (Ingénieur civil des mines)**, *Mines de Nancy*, Nancy, France.
Specialty: functional materials.

2012 **Master's Degree in Condensed Matter**, *University of Lorraine*, Nancy, France.
Specialty : physics, plasmas, photonic.

2011 **Zertifikat Deutsch**.
German, B2 level.

2010 **Certificate of Proficiency in English**, *Cambridge ESOL*.
C1 level.

2006 **General baccalaureate**, *François Truffaut high school*, Courcouronnes, France.
Scientific stream, with mathematics specialty.

Work experience

Oct. 2015 — Sept. 2016 **Research and Teaching Attaché (ATER)**, *University of Western Brittany*, Brest, France.
Seminars and practical works, applied optics course for L3 students.

Oct. 2012 — Sept. 2015 **Teaching Associate**, *University of Western Brittany*, Brest, France.
Seminars and practical works, for L1 students.

Aug. to Sept. 2014 **Mobility**, *Department of Physics*, University of Johannesburg, South Africa.
Low temperature SQUID measurements / Python courses teaching.

July to Aug. 2013 **Mobility**, *Department of Physics*, University of Johannesburg, South Africa.
Low temperature SQUID measurements.

Oct. to Jan. 2013 **Khôlles**, *La Croix Rouge high school*, Brest, France.
Oral exams in physics for preparatory classes.

Feb. to June 2012 **Master internship**, *Laboratoire de physique des matériaux*, Jean Lamour institut, Nancy.
Micromagnetic simulations of domain wall motions in magnetic nanowires.

Sup. Daniel Lacour

Aug. to Sept. 2011 **PETRUS intership**, *Pragua*, République tchèque.
Programme européen de formation de stockage géologique de déchets radioactifs.

July to Aug. 2011 **Internship 2nd year**, *Jean Lamour institut*, Nancy, France.
Ab initio study of lead adsorption on the $Al_{13}Fe_4$ allow surface.

Sup. Émily Gaudry

Fév. à mars 2010 **Worker internship**, *Geislingen-Binsdorf*, Germany.
Photovoltaic pannels installation.

Projects
- informatic club: management of the student appartment building network.
- software development for the *Direction interdépartementale des routes de l'est.*

Skills

Growth
- radio-frequency sputtering

Analysis
- X-ray diffraction (XRD)
- Atomic force microscopy (AFM)
- Profilometry
- Vectorial vibrating sample magnetometer (VVSM)
- SQUID magnetometer (PPMS Quantum Design)
- development of a liquid nitrogen immersion cryostat

Computing
- Programming: Python (Numpy, Scipy, TkInter), Perl, Matlab, Java, Fortran, Web languages.
- LaTeX, XeLaTeX, Open Office.
- Advanced knowledge of Mac and Linux, and UNIX command line environment.

Languages

French — Native

English — Fluent, spoken and written *Level C1*

German — Intermediary *Level B2*

Spanish — Beginner

Conferences

April 2016 **Louis Néel symposium**, *Saint-Dié-des-Vosges*, France.
Poster

May 2015 **INTERMAG conference**, *Beijing*, China.
Oral

Dec. 2014 **C'Nano conference**, *Orléans*, France.
Oral

Sept. 2014 **Louis Néel symposium**, *Grenoble*, France.
Oral

August 2014 **Seminary**, *Johannesburg*, South Africa.
Oral

Nov. 2013 **C'Nano conference**, *Rennes*, France.
Oral

March 2013 **Louis Néel symposium**, *Tours*, France.
Poster

Publications

2016 J. Ben Youssef, J. Richy, N. Beaulieu, T. Hauguel, D. T. Dekadjevi, J.-Ph. Jay, D. Spenato, and S. P. Pogossian. "FMR studies of exchange-coupled multiferroic polycrystalline Pt/$BiFeO_3$/$Ni_{81}Fe_{19}$/Pt heterostructures". In: *Journal of Physics D: Applied Physics* 49.37, p. 375001. DOI: 10.1088/0022-3727/49/37/375001.

J. Richy, T. Hauguel, J-Ph Jay, S. P. Pogossian, et al. "Temperature dependence of exchange biased multiferroic BiFeO3/Ni81Fe19 polycrystalline bilayer". In: *ArXiv e-prints* 1608.00736. Submitted to J. Appl. Phys.

J. Richy, J.-Ph. Jay, S. P. Pogossian, J. Ben Youssef, C. J. Sheppard, A. R. E. Prinsloo, D. Spenato, and D. T. Dekadjevi. "Thermal simulation of magnetization reversals for size-distributed assemblies of core-shell exchange biased nanoparticles". In: *Journal of Applied Physics* 120.8, p. 083905. DOI: 10.1063/1.4961324.

2013 D. T. Dekadjevi, A. R. E. Prinsloo, E. Carleschi, J. Richy, et al. "Driving the magnetization reversal below the blocking temperature in exchange biased NiFe/NiO". In: *Journal of Applied Physics* 114, p. 3904. DOI: 10.1063/1.4820249.

Communications

2016 J. Richy, J. Ph. Jay, S. P. Pogossian, J. Ben Youssef, C. J. Sheppard, A. R. E. Prinsloo, D. Spenato, and D. T. Dekadjevi. "Dépendance en température des propriétés du couplage d'échange dans $BiFeO_3$/$Ni_{80}Fe_{20}$ polycristallin". In: *Colloque Louis Néel*. Saint-Dié-des-Vosges, France.

2015 J. Richy, T. Hauguel, J.-Ph. Jay, S. P. Pogossian, et al. "Temperature dependence of the exchange bias properties in polycrystalline $BiFeO_3$/$Ni_{80}Fe_{20}$". In: *INTERMAG 2015*. Beijing, China.

C. J. Sheppard, A. R. E. Prinsloo, M. Kadam, E. Fullerton, D. Dekadjevi, P. Éliès, J. Richy, and B. S. Jacobs. "Electrical, structural and morphological properties of epitaxially grown Cr100-x Cox alloy thin films". In: *20th International Conference on magnetism*.

2014 J. Ben Youssef, S. P. Pogossian, T. Hauguel, J. Richy, D. T. Dekadjevi, J.-Ph. Jay, and D. Spenato. "Étude de la dynamique de l'aimantation dans les hétérostructures polycristallines à base de BFO/Permalloy couplés par échange". In: *XVIème colloque Louis Néel*. Autrans, France.

J. Richy, T. Hauguel, J.-ph. Jay, S. P. Pogossian, et al. "Dépendance en température du couplage d'échange de NiFe/$BiFeO_3$ polycristallin". In: *XVIème colloque Louis Néel*. Autrans, France.

2013 T. Hauguel, S. P. Pogossian, D. T. Dekadjevi, D. Spenato, J-Ph Jay, J. Richy, and J. Ben Youssef. "Mécanisme du couplage d'échange et anisotropies magnétiques dans les bicouches polycristallines mutiferroïques $BiFeO_3$/Permalloy". In: *XVe colloque Louis Néel*. Tours, France.

Activities

- Photography, music, violin
- Hiking, cycling, climbing
- Home automation, programming with Arduino and Raspberry