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Rafal NOGA

PhD student in Process and Systems Engineering at University of Valladolid in Spain

Date of birth:	September 22, 1982
Citizenship:	Polish
Address:	12, rue des Hautains 01630 St Genis Pouilly France
Phone:	0041 76 268 8347 (swiss mobile phone)
Email:	mail@rafal-noga.com
Www:	http://www.rafal-noga.com

Education

I am currently completing a PhD program at University of Valladolid (Spain) that is in cooperation with the European Organization for Nuclear Research (Switzerland). For one year, I have researched for the PhD at Osaka University (Japan).

2008 to date — PhD student in Process and Systems Engineering,
University of Valladolid, Spain

I have completed an international program between Grenoble Institute of Technology (France), Karlsruhe University (Germany) and Gdansk University of Technology (Poland). I have completed part of my education at each institution and I have been awarded a Master's degree from each of the institutions. I have worked on my Master Thesis "Modelling and control of the String2 LHC Prototype at CERN" at University of Valladolid (Spain).

2007 — M.Sc. ("Master Recherché") in Control Engineering
École Nationale Supérieure d'Ingénieurs Électriciens de Grenoble (ENSIEG)
Grenoble Institute of Technology (INPG), France

2007 — M.Sc. ("Ingénieur Diplômé") in Control Engineering
École Nationale Supérieure d'Ingénieurs Électriciens de Grenoble (ENSIEG)
Grenoble Institute of Technology (INPG), France

2007 — M.Sc. ("Diplomingenieur") in Control Engineering
Department of Electrical Engineering and Information Technology
Karlsruhe University, Germany

2007 — M.Sc. (Magister Inżynier) in Control Engineering
Faculty of Electronics, Telecommunications and Informatics
Gdansk University of Technology, Poland

2002 — "Technician in Electronics"
secondary school diploma awarded after 5 years of technical studies in electronics

Employment

2008 to 2013	Doctoral Student and Unpaid Associate in Industrial Controls & Electronics Group at Engineering Department and in Cryogenics Group at Technology Department at European Organization for Nuclear Research (CERN) in Geneva, Switzerland *First principles modelling, simulation and application of real time optimization to state estimation and control of the Super fluid Helium Cryogenic Circuit at the Large Hadron Collider at CERN*
2007 to 2008	MSc Final Project and researcher position in Systems Engineering and Automatic Control Department, University of Valladolid, Spain *First principles modelling and simulation of the Superfluid Helium Cryogenic Circuit at the Large Hadron Collider Prototype "String2"*
2006	Internship in System and Software Design Team, ATENA Engineering GmbH (Assystem Group), Munich, Germany *Rapid Prototyping using Matlab/Simulink and dSPACE RTC/Control Desk and other activities related to development of hardware and software for an HIL simulation of the "A400M" aircraft turbine engine*
2004 to 2005	Student job at Institute of Algorithms and Cognitive Systems, Karlsruhe University, Germany *Perl programming for a data mining project*

Languages

I have been an official CERN guide giving presentations and guiding tours in Polish, English, French, German and Spanish. I have studied and worked for 1.5 years in Germany, 1 year Spain, 1 year in Japan and I have been living for more than 5 years in France and French speaking part of Switzerland.

- Polish: mother-tongue
- English: good communication skills
- German: good communication skills; DSH-3 certificate in 2005
- French: good communication skills; TCF-4 certificate in 2007
- Spanish: good communication skills; EOI-2 certificate in 2007
- Japanese: basic knowledge

Research Experience

2007 to date	PhD Project: Non-linear Model Predictive Control (NMPC) for the Superfluid Helium Cryogenic Circuit at the Large Hadron Collider; see: http://www.rafal-noga.com/lhc-nmpc/ *System analysis; development of first principles, numerical models of the distributed parameters system to be used in simulation and online optimization; development, prototype implementation and experimental validation of Moving Horizon State Estimators and Non-linear Model Predictive Controllers for the LHC cryogenic system*

Additional skills and knowledge

- ✓ Computer science:
  - C, Perl, Matlab, Mathematica: good programming skills
  - Numerical methods for solving ODE's, parabolic PDE's, linear and nonlinear optimization problems: user's knowledge
  - C++, Java, MS Visual Basic: basic programming skills
  - Web applications: basic programming skills in PHP, Perl, MySQL, XML-XLS, Flash, HTML, CSS, Java-Script
  - MS Office 2003&2007 and LaTeX : good skills in creation and edition of professional documentations, presentations and scientific publications
  - MS Windows operating systems: good user knowledge
- ✓ Physics:
  - Thermodynamics, fluid mechanics and superfluid helium cryogenics: good knowledge
- ✓ Systems and Control:
  - System analysis, modelling, simulation and control design using Matlab/Simulink, Mathematica and EcosimPro: good skills
  - First principles based modelling with focus on optimization for low computing cost and numerical robustness: good knowledge
  - Distributed parameter systems: good skills in modelling and analysis
  - Numerical simulations: good skills in design and implementation
  - Non-linear Model Predictive Control: good knowledge of optimal control setup, development and implementation of optimization algorithm, controller simulation and tuning
  - SCADA panels development in PVSS II: basic skills
- ✓ Electronics:
  - Analogue and digital electronic circuits development: some years of experience in the past in design, simulation, realization and testing using Pads, Protel 99 SE and PSpice
  - Microprocessor systems development: some years of experience in the past with 8051 and Atmel AVR microcontrollers programmed in assembler, C and Basic
- ✓ Licensed motorcycle and car driver, certified inland skipper, certified glider pilot

Honors and Awards

2009 to 2010	Research Student at Osaka University for "FrontierLab@OsakaU" and scholar of Japan Student Services Organization (JASSO)
2005 to 2007	Scholar at the German-French University

Extracurricular activities

Leisure and occasional sailing, swimming, running, hiking, snowboarding, bicycle and motorcycle riding, travelling, paragliding, gliding, model plane building, electronics and do-it-yourself projects

Referees

References are available upon request

Proceedings contribution

R Noga, T Ohtsuka, C de Prada, E Blanco, and J Casas. Simulation Study on Application of Nonlinear Model Predictive Control to the Superfluid Helium Cryogenic Circuit; In Proceedings of the 18th IFAC World Congress, 2011

R Noga, T Ohtsuka. NMPC for stiff, distributed parameter system: Semi-Automatic Code Generation and optimality condition evaluation; In Proceedings of the 18th International Conference on Process Control, 2011

R Noga, T Ohtsuka, C de Prada, E Blanco, and J Casas. Nonlinear Model Predictive Control for the Superfluid Helium Cryogenic Circuit of the Large Hadron Collider; In Proceedings of the 2010 IEEE International Conference on Control Applications, 2010

R Noga, C de Prada. First principles modeling of the Large Hadron Colliders (LHC) Super Fluid Helium Cryogenic Circuit; In Proceedings of 20th European Modelling and Simulation Symposium (EMSS08), 2008