



CURRICULUM VITAE

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Personal information

- Born : Uccle (Belgium), April 8, 1965
- Citizenship : Belgian
- Married, 3 children

Education

1987 M. Eng. in Electronics and Telecommunication (5-year programme), ULB, with highest honors.

1988 M. Sc. in Theoretical Physics, ULB, with highest honors.

1993 Ph. D. in Physics, ULB, with highest honors.
Thesis : *Nuclear level densities, pairing correlations, and their role in Astrophysics.*

1995 Abilitation to teach at university level ("Agrégé de l'enseignement supérieur"), ULB.
Thesis : *Monte Carlo methods : application to the study of quantum systems.*

Employment history

1988-1993 Ph. D. student, Institute of Astronomy and Astrophysics, ULB, supervised by Prof. M. Arnould. (*Note : it includes a 1-year leave of absence for military service.*)

1993-1995 Postdoctoral Research Associate, Department of Theoretical Physics, University of Paris XI, Orsay (France), supervised by Prof. O. C. Martin.

1995-1998 Postdoctoral Research Fellow, Division of Quantum Information and Computation, California Institute of Technology, Pasadena (USA), supervised by Prof. S. E. Koonin.

1998-present Associate Professor, Ecole Polytechnique, ULB. (Promoted to Full Professor in 2009.)
Teaching Information, Coding & Communication Theory, and Quantum Mechanics.

2001-present Director of the Centre for Quantum Information and Communication (QuIC), ULB.

Awards, fellowships, and scientific prizes

- FNRS research fellow ("Aspirant"), 1988-1993.
- Marie Curie fellow (Human Capital and Mobility Programme, EC), 1993-95.
- Caltech research fellow / senior research fellow, California Institute of Technology, 1995-98.
- NATO grant for scientific research, 1996.
- Caltech President's Fund Award, 1997.
- Alcatel-Bell Scientific Prize (awarded by the FNRS), 1999.
- Fulbright Advanced Research/Lecturing Award, 1999.
- Prize of the International Wernaers Fund (awarded by the FNRS), 2000.
- Marie Curie excellence award (awarded by the EC), 2006.
- Member of the Royal Academies for Science and the Arts of Belgium (since 2009)

Visiting positions

Visiting Professor, Institute for Quantum Information (IQI), California Institute of Technology, Pasadena (USA), from November 29 to December 13, 1998; then regular one-month visits in the Summer 1999, 2000, 2001, 2002, 2003, 2004, 2005, and 2007.

Visiting Associate (expert) for the Research Section *Information and Computing Technologies*, Jet Propulsion Laboratory, NASA & California Institute of Technology, Pasadena (USA), from August 5 to October 23, 1999; then a few weeks every Summer until this Section was dissolved.

Invited as a Visiting Professor at the Institut Henri Poincaré (Paris) from January 9 to February 3, 2006, to give a course in the programme “*Quantum information, computation and complexity*”.

Invited as a Visiting Professor at the Katholieke Universiteit Leuven, April 3 – 14, 2006, to give a course on quantum optics and quantum information.

Invited as Visiting Professor (sabbatical) at the Center for Extreme Quantum Information Theory, Massachusetts Institute of Technology, Cambridge (USA), from November 2008 to February 2009 (4 months) and from September 2010 to January 2011 (5 months).

Professor of the course “*Introduction à l’information quantique et au calcul quantique*”, 2009, Collège Belgique (Royal Academies for Science and the Arts of Belgium).

Publications

Journal publications

- Author of > 120 papers in peer-reviewed journals, including 28 papers in *Physical Review Letters*, 2 papers in *Reviews of Modern Physics*, 1 paper in *IEEE Transactions on Information Theory*, 1 letter in *Nature Photonics*, and 1 letter in *Nature* (received > 320 citations and was ranked by ISI in the top 1% of the most influential articles within its field)

Books and reviews

- Author of 6 book contributions, including a chapter in the first book devoted to the topic of *Quantum information with continuous variables* by S.L. Braunstein and A.K. Pati.
- Co-editor of a book on this topic published by *Imperial College Press* in 2007.

Patents

- Co-author of 2 patents (1 delivered in 2008, 1 filed in 2009).

International conferences and seminars

Presented numerous contributed and invited talks at international conferences, including several invited lectures or courses at international schools or training workshops. Also presented many invited research seminars.

Principal organizer of the first international conference devoted to the subject of *Quantum information with continuous variables*, CVQIP’02, which took place in Brussels, 2002. In view of this success, a series of conferences was initiated (CVQIP’03 in Aix-en-Provence, CVQIP’04 in Veilbronn, CVQIP’05 in Prague, CVQIP’06 in Copenhagen, CVQIP’07 in St Andrews, CVQIP’10 in Ammersee, CVQIP’11 in Paris). Was co-organizer of these conferences.

Co-organizer of the *ESF exploratory workshop on Long-distance Quantum Communication Networks with Atoms and Light* (CVQIP’05), Prague, Czech Republic, April 9-12, 2005.

Co-organizer of the *26th Symposium on Information Theory in the Benelux*, Brussels, May 19 – 20, 2005.

Co-organizer of the special session on *Quantum Optics and Quantum Information*, ICO Topical Meeting on Optoinformatics/Information Photonics, IV International Optical Congress « Optics – XXI Century », St-Petersbourg, Russia, September 4-7, 2006.

Chair of the first *Solvay Workshop on Bits, Quanta, and Complex Systems: Modern approaches to photonic information processing*, which took place at the Palace of the Royal Academies for Science and the Arts of Belgium, Brussels, from April 30 to May 3, 2008.

Group leader, scientific and organizational responsibilities

Director of the *Centre for Quantum Information and Communication* since 2001. Leading a research group of more than 10 people.

Was advisor of 7 Ph.D. theses (+ 3 at present). After graduation, the Ph.D. students have been offered postdocs in many international groups (Université de Genève; University of Barcelona; California Institute of Technology; ICFO-Barcelona; Université de Paris XI Orsay; University of California Berkeley; NEC-Princeton; STMicroelectronics; Massachusetts Institute of Technology; City University of New York; Max Planck Institute for Quantum Optics in Garching).

Was advisor of 18 Ms. theses and co-advisor of 4 Ms. theses (1 at Vrije Universiteit Brussels, 2 at Ghent University, 1 at Ecole Normale Supérieure in Lyon, France, and 1 at Johannes Gutenberg University in Mainz, Germany) .

Was supervisor of 10 post-doctoral researchers (+ 5 at present)

Belgian member of the steering committee of the scientific programme *Quantum information theory and quantum computation*, funded by the European Science Foundation (1999-2004).

Belgian member of the governing board of the European Coordinating Action QUROPE (*Quantum Information Processing and Communication in Europe*), 2006-2009.

Belgian member of the scientific board of the European Coordination Action QUIE²T (*Quantum Information Entangled-Enables Technologies*), 2010-2013.

Participates (or has participated) in the European projects:

- QUIPROCONE (*Quantum Information Processing and Communications Network of Excellence*); Grant: IST-1999-29064, from 2000 to 2004
- EQUIP (*Entanglement in Quantum Information Processing and Communication*)
Grant: IST-1999-11053, from 01/01/2000 to 31/12/2002
- CHIC (*Consortium for Hamiltonian Intra-molecular Computing*)
Grant: IST-2001-32150, from 01/07/2002 to 30/06/2006
- RESQ (*Resources for Quantum Computation*)
Grant: IST-2001-37559, from 01/01/2003 to 31/12/2005
- SECOQC (*Development of a Global Network for Secure Communication based on Quantum Cryptography*)
Integrated Project (IP): IST-2002-506813, from 01/04/2004 to 31/03/2008
- COVAQIAL (*Continuous Variable Quantum Information with Atoms and Light*)
Specific Targeted Research Project (STREP): FP6-511004, from 01/09/2004 to 31/08/2007
Coordinated by N. J. Cerf; total budget =1.4 M EUR
- QAP (*Qubit Applications*)
Integrated Project (IP): from 01/11/2005 to 30/10/2009
- QUROPE (*Quantum Information Processing and Communication in Europe*)
Coordinated action (CA): from 01/09/2006 to 31/08/2009
- COMPAS (*Computing with Mesoscopic Photonic and Atomic States*)
Specific Targeted Research Project: FP7-ICT-2007-C-212008, from 01/04/2008 to 31/03/2011
Coordinated by N. J. Cerf; total budget =1.6 M EUR
- HIPERCOM (*High-performance coherent quantum communications*)
ERA-NET, European coordinated research on long-term challenges in ICST: from 01/09/2011 to 31/08/2014. Coordinated by N. J. Cerf; total budget = 1.2 M EUR

Funding from Belgian institutions:

- FNRS: 1 individual grant (“Crédit aux chercheurs”), 1998-1999.
- FNRS: 4 grants (“Conventions du FRFC”), 2000-2001, 2002-2007, 2003-2005, 2008-2011.
- ULB: 3 grants (“Fonds d’Encouragement pour la Recherche – FER”), 2000, 2003, 2008.
- Brussels Capital Region Government: 1 grant (“LINK”), 1999-2003.
- Communauté Française: 1 grant (“Action de Recherche Concertée – ARC”), 2000-2005.
- Belgian Federal Government: 2 grants (“Inter-University Attraction Pole – IUAP”), 2002-2006 and 2007-2011; in charge of coordinating the workpackage on “Quantum Information”.
- Brussels Region: 3 grants (coordinator of project “CRYPTASC” within “ICT Impulse Program” involving 4 teams, from 01/09/2007 to 31/08/2013, total budget = 2.2 M EUR; scientific advisor of 2 other projects within “Prospective Research in Brussels” and “Spin-off in Brussels”).

Research valorization and links with industry

Co-author of a patent on a high-rate quantum key distribution scheme using coherent light states. A prototype of this invention, adapted to telecom wavelengths, was tested in the laboratory of the French company *Thales*, and was demonstrated as a successful QKD platform in project SECOQC.

Principal investigator of the project “LINK” with the support of the company *STMicroelectronics – Proton Technologies*, specialized in security and cryptography applications. An engineer employed half-time by this company, G. Van Assche, was also a Ph.D. student at QuIC. His Ph.D. thesis was published as a book by *Cambridge University Press* (2006).

Was in charge of presenting a synthesis on quantum information for the *Observatoire Français des Techniques Avancées* (OFTA) to be included in a progress report on nanosciences and nanotechnologies to the attention of the technology and industry communities: ARAGO n°26, “Nano-composants et nano-machines” (éditions Tec&Doc, 2000).

Was responsible for a project “Spin-off in Brussels” with 2 former Ph.D. students (L.-P. Lamoureux and J. Niset), which has led to the creation of a start-up company “SQR Technologies” in 2010.

Role in increasing the public awareness of science

Popular science articles

- Author of 8 scientific popularizing papers, 5 having been published in the renowned French popular science journal *La Recherche*
- 1 of them (co-authored with N. Gisin) in a special issue of *La Recherche* devoted to Einstein’s legacy and the year of physics
- 2 of them (co-authored with G. Brassard, C. Crépeau, and N. Gisin) in a special column of *La Recherche* treating the subject of *Quantum teleportation*.

Seminars and interviews

- Presented 7 scientific popularizing seminars on *quantum information science* for different public: secondary school students, undergraduate students, physics teachers at secondary school, industry, and general public.
- Was interviewed by *Radio France Internationale* (Paris) on January 21, 2000; programme “Le Monde Change” by Patrick Chompré.
- Was interviewed by Belgian national TV news (*Journal Télévisé, RTBF*) on April 18, 2005; by Pascale Bollekens.
- Was interviewed by *Radio France Internationale* (Paris) on April 28, 2005; programme “Le Monde Change” by Patrick Chompré.
- Was interviewed by *France Info* on May 12, 2005, and on August 25, 2005; chronique “Profession chercheur” by Marie-Odile Monchicourt.
- Was interviewed by Belgian national radio (*La Première, RTBF*) on December 4, 2005, and on December 11, 2005; programme “Semences de curieux” by Jacques Olivier.
- Was interviewed by Denis Delbecq in *La Recherche*, vol. n° 455, September 2011, « Un nouveau monde quantique », p. 48-50.
- Was interviewed by Azar Khalatbari in *Sciences et Avenir*, n°776, October 2011, « Une piste pour les ordinateurs du futur », p. 24.

The prize *La Recherche 2004* was awarded to 5 Ph.D. students of the Institut d'Optique d'Orsay (Prof. P. Grangier) and QuIC (Prof. N. Cerf) for the joint work of the two teams on quantum cryptography: R. Alléaume, A. Beveratos, F. Grosshans, J. Wenger and G. Van Assche.

International collaborations

- Institut d'Optique d'Orsay, Palaiseau, France : Prof. Ph. Grangier
- Group of Applied Physics, University of Geneva, Switzerland : Prof. N. Gisin
- California Institute of Technology (Caltech), Pasadena, USA : Prof. C. Adami
- Niels Bohr Institute, Copenhagen, Denmark : Prof. E. S. Polzik
- University of Pavia, Italy : Prof. G. M. D'Ariano
- Palacky University, Olomouc, Czech Republic : Profs. J. Fiurasek and R. Filip
- La Sapienza University, Roma, Italy : Prof. F. De Martini
- Max Planck Institute for the Sciences of Light, Erlangen, Germany : Prof. G. Leuchs
- Université Lille 1, France : Prof. M. Kolobov
- Danish Technical University, Copenhagen, Denmark: Prof. U. Andersen
- Georgia Tech Lorraine (GTL), Metz, France : Prof. S. W. McLaughlin
- Massachusetts Institute of Technology, Cambridge, USA: Profs. J.H. Shapiro and S. Lloyd

Miscellaneous

Member of the thesis committees of more than 15 Ph.D. students, in Belgium and abroad.

Serving as a referee for several scientific journals, including *Physical Review*, *Physical Review Letters*, *Nature*, *Science*, and *IEEE Transactions on Information Theory*.

Member of the international programme committee of several scientific conferences.

Serving as an evaluator for the European Commission, the Agence Nationale de la Recherche (France).

Member of the Belgian Physical Society (BPS), European Physical Society (EPS), Euroscience (founding member), American Association for the Advancement of Science (AAAS), Institute of Electrical and Electronics Engineers (IEEE), and Marie-Curie Fellows Association (MCFA).

Coordinator of the European research project COVAQIAL, which was selected as a nominee by the Grand Jury for the *2007 Descartes Prize for Transnational Collaborative Research*.