Curriculum Vitae

Gabriele B. Belle

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EDUCATION

INTERNATIONAL SPACE UNIVERSITY (ISU), Strasbourg, France
M. S. S. Space Studies July 1997
Project: "Space-based Navigation with NAVSTAR GPS"

RADBOUD UNIVERSITY, Nijmegen, Netherlands
Ph.D. Physics and Mathematics December 1985
Thesis: "Magneto-optical Studies of Quantum Wells and Superlattices"

KARL FRANZENS UNIVERSITY, Graz, Austria
M. S. Physics February 1982
Thesis: "Intra-band Transitions in $Pb_{1-x}Ge_xTe$"

TEACHING EXPERIENCE

GEORGE MASON UNIVERSITY August 2016 – present
Term Assistant Professor, Department of Physics and Astronomy, Fairfax, VA

Online laboratory courses taught:
ASTR 112 Introductory Astronomy Lab: The Solar System, Fall 2016, 2017, 2018, Summer 2018, 2019
ASTR 114 Introductory Astronomy Lab: Stars and Galaxies, Spring 2017, 2018, 2019

Lecture courses taught:
PHYS 243 College Physics I, Summer 2017, 2018, 2019, Fall 2017, 2018, 2019
PHYS 245 College Physics II, Summer 2017, 2018, 2019, Spring 2017, 2018, 2019
PHYS 260 University Physics II, Summer 2017

Laboratory courses taught:
PHYS 244 College Physics Lab I, Fall 2016, 2017, 2018, 2019
PHYS 246 College Physics Lab II, Spring 2017, 2018, 2019, Summer 2018, 2019
PHYS 311 Instrumentation, Fall 2017, 2018, 2019

Lab Coordinator:
PHYS 244 College Physics Lab I, Fall 2016, 2017, 2018, 2019 Spring 2017, 2018, 2019, Summer 2018, 2019
PHYS 246 College Physics Lab II, Fall 2016, 2017, 2018, 2019, Spring 2017, 2018, 2019, Summer 2018, 2019

GEORGE MASON UNIVERSITY July 2009 – August 2016
Adjunct Professor, Department of Physics and Astronomy, Fairfax, VA

Online laboratory courses developed:
ASTR 112 Introductory Astronomy Lab: The Solar System
ASTR 114 Introductory Astronomy Lab: Stars and Galaxies

Lecture courses taught:
PHYS 245 College Physics II, Summer 2009, 2010, 2016
PHYS 104 Physics Everyday Phenomena II, Spring 2010
ASTR 111 Introduction to Solar System, Fall 2010, 2011, 2012
PHYS 260 University Physics II, Fall 2012, Summer 2010, 2011, 2012
PHYS 262 University Physics III, Summer 2014, 2015
MATH 105 Pre-calculus, Fall 2009, 2010

Laboratory courses taught:
ASTR 112 Solar System, Fall 2009, 2011, 2013, 2014, Summer 2010, 2016
ASTR 114 Stars/Galaxies, Spring 2010**,** 2011, 2012, 2013, 2016, Summer 2014, 2015, 2016
PHYS 244 College Physics Lab I, Fall 2009, 2013, Summer 2013
PHYS 246 College Physics Lab II, Fall 2012, Spring 2012, 2013, 2014, Summer 2013
PHYS 161 University Physics Lab I, Fall 2013, Spring 2014, 2015
PHYS 261 University Physics Lab II, Fall 2013, 2014, Spring 2013, 2015, 2016, Summer 2012, 2013
PHYS 263 University Physics Lab III, Fall 2015, Summer 2015, 2016
SYST 221 Systems Modeling Laboratory, Spring 2010

Recitations taught:
Phys 260, Fall 2012, Summer 2011, 2012
Phys 262, Summer 2014, 2015

Lab Coordinator:
PHYS 244 College Physics Lab I, Summer 2013

A+ ACADEMY November 2007 – June 2009
Tutor, McLean, VA
Tutored elementary, middle, and high school students in Mathematics and Physics.

PIKES PEAK COMMUNITY COLLEGE January 2001 – June 2003
Lab Coordinator, Instructor, Integrated Circuit Fabrication Institute and Electronics Department, Colorado Springs, CO

Lecture courses developed:
ELE 112 Passive Circuits
ICF 106 Semiconductor Active Devices and Mixed Signal ICs
ICF 108 Control Systems
ICF 214 RF Energy

Laboratory courses developed:
ELE 113 Passive Circuit Lab
ICF 107 Semiconductor Active Devices and Mixed Signal ICs Lab

Lecture courses taught:
ELE 114 Semiconductor Active Devices
ELE 118 Digital Circuits
ICF 106 Semiconductor Active Devices and Mixed Signal ICs
ICF 108 Control Systems
ICF 214 RF Energy
MAT 108 Technical Mathematics

Laboratory courses taught:
ELE 115 Semiconductor Active Devices Lab
ELE 119 Digital Circuits Lab
ICF 107 Semiconductor Active Devices and Mixed Signal ICs Lab

UNITED STATES AIR FORCE ACADEMY January 1998 – January 2001
Visiting Scholar, Department of Astronautics, Colorado Springs, CO

Lecture courses taught:
ASTRO 320 Introduction to Astronautics for Engineers and Scientists
ASTRO 331 Space Vehicle Systems Design (Selected Lectures)

Laboratory courses taught:
ASTRO 433/ENGR 433 Aerospace Vehicle Systems Design

Other courses:
ASTRO 491 Special Projects

UNIVERSITY OF ULM April 1990 – August 1997
Assistant Professor, Technical Director of Microelectronics Research Center, Department of Electron Devices and Circuits, Ulm, Germany

Lecture and recitation courses developed and taught:
Einführung in die Satellitentechnik /Introduction to Satellite Communication (Lecture and Recitation)
Halbleiterbauelemente Übungen /Semiconductor Devices (Recitation)
Technische Elektronik/Technical Electronics (Recitation)
Sensoren/Sensors (Recitation)

Laboratory courses developed and taught:
Praktikum Halbleitertechnologie / Laboratory in Semiconductor Device Technology

FELLOWSHIPS AND AWARDS

Nomination for GMU Inaugural Online Teaching Excellence Award	2018
Air Force Association's Citation of Honor, Falcon Gold Project, Team Achievement Award	1998
AIAA Special Recognition Award, Falcon Gold Project, Team Achievement Award	1998
Master of Space Studies Program Scholarship	1996
Space Studies Summer Session Program Fellowship	1995
Nomination for State Teaching Award of Baden – Wuerttemberg	1994
Max Planck Society Research and Dissertation Completion Scholarship	1981 – 1985

GRANTS

George Mason University, Office of the Provost, 4VA Grant to develop open educational resources for ASTR 112, ASTR 114, ASTR 115; Awarded in 2018
George Mason University, Department of Distance Education, Upgrade of an online Astronomy Science Lab: ASTR 114; Awarded in 2016
George Mason University, Department of Distance Education, Development of an online Astronomy Science Lab: ASTR 114; Awarded in 2013
George Mason University, Department of Distance Education, Development of an online Astronomy Science Lab: ASTR 112; Awarded in 2012
Daimler Benz Forschungszentrum, (EADS GMbH), Ulm, Germany, Research Study on "Mobile Satellite Communications and Satellite Navigation Systems – A Comparison"; Awarded 1996
University of Ulm, Travel Grant for Participation in the Master of Space Studies Program at the International Space University in Strasbourg, France; Awarded 1996

SERVICE

Mason Effective Teaching Committee.	2019
Served on the GMU selection committee for the 2018-2019 Fenwick Fellow.	2018
Served as judge for the Loudon County High School research paper presentation.	2018
Member of the GMU Physics Department committee for undergraduate laboratories.	2016-present

RESEARCH

Assessed GPS signal in geosynchronous transfer orbit (United States Air Force Academy, Department of Astronautics, January 1997 to December 1998)
Investigated low frequency noise of short gate length GaAs MESFETs and HEMTs (University of Glasgow, Scotland, July1994 to September 1994)
Researched electrical properties of low noise HEMTs (Siemens A.G., Department of Discrete Semiconductor Devices, January 1986 to April 1990)
Performed magneto-optical studies of GaAs-$Ga_{1-x}Al_xAs$ quantum wells and superlattices in high magnetic fields (Max Planck Institute, High Magnetic Field Laboratory, Grenoble, France, January 1983 to December 1985)
Conducted magneto-spectroscopy experiments on $Cd_{1-x}Mn_xTe$ (Max Planck Institute, High Magnetic Field Laboratory, Grenoble, France, December 1981 to December 1982)
Investigated intra-band transitions in $Pb_{1-x}Pb_xTe$ (Mining University, Department of Physics, Leoben, Austria, March 1980 to July 1981)

CERTIFICATIONS AND LICENSES

Satellite Tool Kit (STK) Certification, STK Professional Edition, Analytical Graphics, Inc., 2007
Instructor Technical Education; Credential for Career and Technical Education, Colorado State Board for Community Colleges and Occupational Education, 2001 – 2004

PROFESSIONAL EXPERIENCE

GEORGE MASON UNIVERSITY

Term Assistant Professor, Department of Physics and Astronomy, Fairfax, VA August 2016 – present

- Teaches College Physics lecture courses in the EMPD2 program.
- Teaches College Physics laboratory courses.
- Coordinates and supervises all seventeen sections of College Physics labs (Phys 244 and Phys 246).
- Provides weekly training for new GTAs who teach Phys 244 and Phys 246.
- Regularly revises lab material for Phys 244 and Phys 246 and implements changes as appropriate. Designs new course material.
- Evaluates new equipment for use in College Physics and University Physics labs.
- Mentored a graduate student in an independent study project (Phys 796).
- Designed and teaches Phys 311 – the Department's new Instrumentation lab course in which students learn basic electronics and different software tools such as pSpice and LabVIEW to design and analyze electronic circuits and virtual instruments.
- Revises, designs, and teaches online Astronomy labs (ASTR 112 and ASTR 114).
- Received a 4VA grant to develop open educational resources for ASTR 112, ASTR 114 and ASTR 115. The goal is to align those lab courses with the corresponding lecture courses ASTR 111 and ASTR 113. The new courses material will be published as a laboratory book by GMU publishing in 2020.
- Created the online version of ASTR 111 on Blackboard.

- Currently develops a lecture course about the physics behind making a microchip. The course could be taught face-to-face or online.
- Serves on the undergraduate lab committee.
- Was nominated for the 2018 Inaugural Online Teaching Excellence award in December 2017.
- Participated in the Physics Department's undergraduate program assessment.
- Reviewed the book "College Physics" from OpenStax. The review was published in the Open Textbook Library https://open.umn.edu/opentextbooks/reviews/1340
- Assesses the attitude of students toward OpenStax's College Physics book using a survey. The project is aimed to combine and analyze data from student surveys from College Physics summer courses in three consecutive years. The library has indicated interest in these data.
- Served as judge in the 2018 Loudon County High School research paper presentation.
- Served on the selection committee for the 2018-2019 Fenwick Fellow.
- Was elected to serve on the Effective Teaching Committee.

Adjunct Professor, Department of Physics and Astronomy, Fairfax, VA July 2009 – August 2016

- Taught lecture and lab courses in Physics, Astronomy, and Mathematics.
- Created the first online Astronomy lab.
- Developed course material for both face-to-face and online Astronomy labs.

PG PUBLIC SERVICES May 2010 – May 2011

Senior Manager, Falls Church, VA

- Created an enterprise requirements management framework for the Program Executive Office (PEO) of ICE OCIO (Department of Homeland Security).
- Performed an analysis of ICE OCIO to determine the current state of the enterprise.

A+ ACADEMY November 2007 – June 2009

Tutor, McLean, VA

- Tutored elementary, middle, and high school students in Mathematics and Physics.

BELLE CONSULTING SERVICES July 2004 – June 2009

Consultant, Falls Church, VA

- Provided management and technical contract assistance services to various clients.
- Naval Surface Warfare Center (NAVSEA): Developed requirements specification for an Integrated Health and Usage Monitoring System (IHUMS).
- National Institutes of Health (NIH): Provided analytical support in various studies.

MAYFAIR AND ASSOCIATES March 2004 – July 2004

Consultant, Washington, DC

- Analyzed business and marketing intelligence for World Wide Retail Exchange.
- Updated customer's marketing and client databases.
- Assisted customer in IT issues related to network security. Monitored and analyzed data exchange between WWRE and its clients worldwide.

PIKES PEAK COMMUNITY COLLEGE January 2001 – July 2003

Coordinator, Instructor, ICFab, Colorado Springs, CO

- Coordinated laboratory courses and headed ICFab laboratory.
- Managed and re-organized lab facilities.
- Developed and taught lecture and lab courses in electronics.

UNITED STATES AIR FORCE ACADEMY February 1998 – January 2001

Visiting Scholar, Department of Astronautics, Colorado Springs, CO

- Taught courses in Astronautics.
- Instructed cadets in designing, building, and testing small satellites.
- Identified GPS – based hardware solution for the "Falcon Gold" satellite, thus ensuring the extraordinary success of the Air Force Academy's first satellite mission.
- Established project documentation standards for the United States Air Force Academy's small satellite program. Reviewed all systems engineering documents.
- Authored the FalconSat-1 design document and the after-action report.
- Initiated a cooperative research agreement between United Technologies Microelectronics Systems (UTMC), an Aeroflex company and the United States Air Force Academy.
- Negotiated with UTMC the funding for the position of the small satellite systems engineer.
- Created a win-win situation which allowed UTMC to space-qualify its new computer hardware.

NAVSYS CORPORATION September 1997 – January 1998

Project Engineer, Monument, CO

- Initiated and managed Falcon Gold project which provided the company with the opportunity to space-qualify its GPS sensor.
- Defined, verified, and validated requirements for GPS systems.
- Chaired quality assurance team.
- Documented system interdependencies between the GPS sensor and other spacecraft subsystems in the Falcon Gold Interface Control Document.
- Resolved coding and timing problem in Colorado Mayday system allowing project to enter phase II on schedule.

EADS GMBH (DAIMLER BENZ FORSCHUNGSZENTRUM) July 1996 – July 1997

Consultant, Ulm, Germany

- Compared and assessed mobile satellite communication and navigation systems.

UNIVERSITY OF ULM April 1990 – August 1997

Assistant Professor, Technical Director of Microelectronics Research Center

Department of Electron Devices and Circuits, Faculty of Engineering Sciences, Ulm, Germany

- Developed and taught courses for the Department of Electron Devices and Circuits.
- Developed and headed a laboratory course in Semiconductor Technology. The course was selected for the State Teaching Award by the student body of the Department of Engineering Sciences of the University of Ulm.

- Created the course “Introduction to Satellite Communication”. This was the first and only space technology course in the curriculum of engineering sciences. Achieved highest student participation in non-mandatory course.
- Successfully expedited the completion of the largest microelectronics technology center at a German university through coordination of user demands with various departments and the planning team, leading to the completion of the 30 Million Dollar project on schedule and within budget.
- Represented the users of the research center in the planning team. The implementation of the user demands of three different departments rendered a challenge to the project team. The interests of the users often conflicted with the vision of the project leaders and the availability of the necessary financial means for implementing the desired technical solutions.
- Successfully mediated between project team and user community.
- Negotiated with the representative of the state government to provide the additional funding necessary to complete all systems in accordance with user requirements and environmental laws.
- Decision maker regarding the purchase and installation of equipment. The budget for the research equipment was about $10 million distributed over a period of five years. It required careful planning to provide the users with the equipment necessary to effectively conduct their research. Met regularly with the department heads to discuss their priorities.
- Evaluated technological needs to ensure everyone’s interests were met. As a result, the three departments that were the main users of the center were able to conduct their research before the center was fully operational.
- Responsible for hiring support personnel. The operation of the center and the exposure of the employees to hazardous materials required training in specific skills. Involved all team members in the development of the operations plan and safety procedures, after providing them with the necessary tools and training.
- Created and implemented requirements framework for research center.
- Developed concept of operations, risk management plan, and configuration management concept.
- Developed interface control document. Planned and documented equipment installation for a 1000 m^2 class 1 to 100 clean room.
- Solved technical and managerial problems, while establishing business relationships with various companies and the state government.

SIEMENS AG January 1986 – March 1990

Product Development Engineer, Munich, Germany

- Managed production of Metal Semiconductor Field Effect Transistors.
- Invented new process technology for the fabrication of high speed semiconductor devices which improved the electrical performance of the devices and increased the yield by 50%.
- Researched fabrication techniques for High Electron Mobility Transistors (HEMTs).

MAX PLANCK INSTITUTE FOR SOLID STATE PHYSICS December 1981 – December 1985

Research Assistant, CNRS, Grenoble, France

- Studied semiconductor materials in high magnetic fields.
- Determined for the first time the exciton binding energy in GaAs-$Ga_{1-x}Al_x$ As quantum well structures.

- Proved that superlattice structures behave like bulk crystals.

  Project: Magneto-optical Studies of Quantum Wells and Superlattices
  Principle investigator: Professor Dr. Jan Kees Maan

MINING UNIVERSITY March 1980 – November 1981

Research Assistant, Institute of Physics Leoben, Austria

- Assisted with equipment installations and calibrations in the newly built lab.
- Tested and calibrated far infrared laser.
- Designed and built a Michelson interferometer.
- Investigated semiconductor materials with laser spectroscopy.

  Project: Intra-band Transitions in $Pb_{1-x}\,Ge_x\,Te$
  Principle investigator: Professor Dr. Günther Bauer

VOLUNTEER EXPERIENCE

INFRAGARD November 2009 – June 2010

Vice President for Community Outreach, Washington DC

Responsible for building relationships between the FBI and leaders in government and industry with the goal to develop a framework for protecting the critical infrastructure of the United States.

INCOSE, WMA CHAPTER January 2007 – January 2010

Programs Chair and Board Director, Washington, DC

Managed and developed professional development program.

Organized business meetings and short courses for the 800+ members of the Washington Metropolitan Area Chapter of the International Council on Systems Engineering.

INTERNATIONAL SPACE UNIVERSITY September 1996 – July 1997

Student Representative for Academic Affairs, Strasbourg, France

Helped and advised students with regard to their academic issues.

UNIVERSITY OF ULM January 1992 – January 1994

Women's Representative, Faculty of Engineering Sciences, Ulm, Germany

Addressed and resolved equal opportunity issues for women in engineering sciences.

PUBLICATIONS

1. T.D. Powell, P. D. Martzen, S.B. Sedlacek, Chia-Chun Chao, R.Silva, A. Brown, **G. Belle**, "GPS Signals in a Geosynchronous Transfer Orbit: Falcon Gold Data Processing", Proc. Of the Institute of Navigation 1999 National Technical Meeting, San Diego, California, January 1-3, 1999.

2. **G. Belle**, D.B. Goldstein, R.W. Humble, D.L. Parker, C. O'Brien, A. Matini, A. Brown, "The U.S. Air Force Academy GPS Flight Experiment", Proceedings of the 10th International Technical Meeting of the Satellite Division of the Institute of Navigation, ION GPS-97, Vol 1, p. 717, September 1997.

3. I.G. Thayne, K. Elgaid, M. R. S. Taylor, M. C. Holland, N.I. Cameron, S. P. Beaumont, **G. Belle**, "Low Frequency Noise of Short Gate Length GaAs MESFETs and HEMTs", 3rd International Workshop on GaAs Devices and Circuits, Firenze, Italy, March, 1995.

4. I.G. Thayne, K. Elgaid, M. R. S. Taylor, M. C. Holland, S. Fairbairn, N. I. Cameron, S. P. Beaumont, **G. Belle**, "Low Frequency Noise of Selectively Dry-etched Gate recessed GaAs MESFETs", Electronics Letters; Vol. 31, No. 4; 2/95.

5. H. Schink, **G. Belle**, "Rauscharme HEMTs mit 0.35 μm Gates", ITG-Fachtagung Heterostrukturbauelemente, Schwaebisch Gmund, Germany, April 1990.

6. H. Huebner, W. Pilz, **G. Belle**, M. Franosch, "Advanced 200nm Gate Profile Fabrication with Reactive Ion Etching", Proc. of the SPIE-Conf. Santa Clara (1989).

7. F. Ponse, **G. Belle,** Th. Stelter, K.H. Mueller, H.Weidlich, "Sub-Half-Micron Gate Length GaAs MESFETs by X-ray Lithography", 11th Workshop on Compound Semiconductor Devices and Integrated Circuits, Grainau 1987.

8. **G. Belle**, J. C. Maan, G. Weimann, "Observation of Magnetic Field Levels in a Superlattice with a Magnetic Field Parallel to the Layers", Surface Sci. 170 (1986) 611 – 617.

9. **G. Belle**, J. C. Maan, G. Weimann, "Measurement of the Miniband Width in a Superlattice with Interband Absorption in a Magnetic Field Parallel to the Layers", Solid State Comm., Vol. 56, No.1, 65 -68, (1985).

10. J. C. Maan, A. Fasolino, **G. Belle**, M. Altarelli, K. Ploog, "Interband Magneto-optical Studies of GaAs-$Ga_{1-x}Al_xAs$ Quantum Wells", Proc. Of the 17th Int. Conf. on the Physics of Semiconductor, San Francisco (1984).

11. J. C. Maan, A. Fasolino, **G. Belle**, M. Altarelli, K. Ploog, "Intra-band Magneto-optical Experiments in $Ga_{1-x}Al_xAs$ - GaAs Quantum Wells", Physica 127B (1984) 426-432.

12. J. C. Maan, **G. Belle**, A. Fasolino, M. Altarelli, K. Ploog, "Magneto-optical Determination of the Exciton Binding Energy in GaAs-$Ga_{1-x}Al_x$as Quantum Wells", Phys. Rev. B Vol. 30(4) (1984).

13. J. C. Maan, **G. Belle**, M. Altarelli, F. Fasolino, K. Ploog, "Two-dimensional Excitons in High Magnetic Fields", Jahresbericht des MPI für Festkörperforschung 1984, I-15/I-17.

14. **G. Belle,** R. Faymonville, M. v. Ortenberg, R. R. Galazka, "Magneto-Spektroskopie am $Cd_{1-x}Mn_xTe$", Verh. DPG(V) 18 (1983) 674.

15. **G. Belle**, R. Faymonville, M. v. Ortenberg, R. R. Galazka, "Sub-millimeter Spectroscopy in $Cd_{1-x}Mn_xTe$", Proc." 7th Int. Conf. on Infrared and Millimeter Waves, Marseille (1983), ed. Faculte des Sciences Saint Jerome, W11-2.

16. **G. Belle**, E. J. Fantner, G. Bauer, A. Lopez-Otero, E. Bangert, "Intra-band Übergaenge im $Pb_{1-x}Ge_xTe$", Verh. DPG (VI) 16 (1981) 190.

PATENTS

G. Belle, E. Knapek, F. Ponse, "Semiconductor Wafer with Doped Kerf-regions", Patent number: 89121925.5, Siemens AG., 1989 – 1995.

F. Ponse, A. Platzer, **G. Belle**, E. Knapek, "Field Effect Transistor with a T-Gate", Patent number: 89121924.8, Siemens AG., 1989 – 1995.

INVITED TALKS AND PRESENTATIONS

"Systems Engineering for Nanosystems", International Council on Systems Engineering, Washington Metropolitan Area Chapter, Washington DC, 2009
"Systems Thinking", Institute of Physics, University of Graz, Austria, 2008
"Falconsat-1 – The Air Force Academy's First Free Flying Satellite", Small Satellite Design and Technology Workshop, Applied Technology Institute, Colorado Springs, Colorado, 2000
"Falcon Gold – The Air Force Academy's GPS Flight Experiment", Core Technologies for Space Conference of the United States Space Foundation, Colorado Springs, 1998

PRESS AND MEDIA

"Air force cadets will fly own birds", Loring Wirbel, EE Times, December 31, 1998

OTHER ACTIVITIES

Conference Session Chair, "Future Mission Concepts", 14th Annual Small Satellite Conference, Utah State University, Logan, Utah, 2000

Co-editor, "Jerry Sellers: Understanding Space", Space Technology Series, United States Air Force Academy, Colorado Springs, Colorado, 2000

Co-author, Team Design Project Report, "M.I.S.S.I.O.N – Multi-mission Innovative Space Systems for an Information Optimized Network", International Space University, Strasbourg, France, 1997

Co-author, Team Design Project Report, "Earth's Polar Regions", International Space University, Strasbourg, France, 1995

SOFTWARE SKILLS

Blackboard, MS Office, Capstone, DataStudio, LabView, Matlab, Multisim, C++, Camtesia, Satellite Tool Kit (STK), HTML, Visio, MS Project