Roozbeh Anvari, PhD

Department of Physics, Engineering Physics & Astronomy
64 Bader Lane, Queen's University, Kingston, ON, Canada, K7L 3N6
Phone: (+1) 647 781 6515 · Email: roozbeh.anvari@queensu.ca

RESEARCH EXPERIENCE

Queen's University, JAN 2019-NOW
Postdoctoral Research Fellow
Developing theoretical and computational models of the linear and non-linear response of monolayer and bilayer graphene to intense terahertz radiation.

University of Western Australia, JUN2018-DEC2018
Research Assistant
Path Integral Monte Carlo implementation of the stochastic optical wave propagation and scintillation through the atmosphere.

University of Western Australia, 2012-2014
Research Assistant
Analytical and numerical modelling of the two-dimensional electron gas in AlGaN/GaN based high speed devices.

University of Western Australia, 2010
Researcher at the Intelligent Information Processing (CIISP)
Exploring new ASIC and FPGA-based solutions for autonomous drive,

EDUCATION

Doctor of Philosophy, JAN2014-NOV2018
University of Western Australia, Perth, Australia
School of Molecular Sciences,
School of Electrical, Electronics and Computer Engineering,
Thesis: Theoretical study of the role of the surface Ga_2O_3/water interface on the two-dimensional electron gas of the AlGaN/GaN heterostructure with applications to chemical sensors.

Master of Engineering, JUL2008-JUL2010
University of Western Australia, Perth, Australia
School of Electrical, Electronics and Computer Engineering,
Thesis: FPGA implementation of the lane detection and tracking algorithm,

Bachelor of Science, OCT2002-JUL2007
IAUTCB, Tehran, Iran
School of Electrical, Electronics and Computer Engineering,
Thesis: Statistical combination of neural networks for breast cancer detection and satellite image processing,

PUBLICATIONS

Impact of nitrogen doping on the linear and nonlinear terahertz response of graphene.
Anvari, R., Zaremba, E., & Dignam, M. M. (2021). *Physical Review B*, *104*(15), 155402.

Pump-induced terahertz anisotropy in bilayer graphene.
Seidl, A., Anvari, R., Dignam, M. M., Richter, P., Seyller, T., Schneider, H., ... & Winnerl, S. (2021). *Physical Review B*, *105*(8), 085404.

Density Functional Theory Simulations of Water Adsorption and Activation on the (− 201) β-Ga2O3 Surface.
Anvari, R., Spagnoli, D., Parish, G., & Nener, B. (2018)
Chemistry–A European Journal, *24*(29), 7445-7455.

Theoretical study of the influence of surface effects on GaN-based chemical sensors.
Applied Surface Science.
Anvari, R., Spagnoli, D., Umana-Membreno, G. A., Parish, G., & Nener, B. (2018).

Effect of pH and structure on the channel conductivity of AlGaN/GaN heterostructure based sensors.
Sensors and Actuators B: Chemical, 269, 54-61.
Anvari, R., Spagnoli, D., Umana-Membreno, G. A., Parish, G., & Nener, B. (2018).

Charging mechanism of AlGaN/GaN open-gate pH sensor and electrolyte interface.
Optoelectronic and Microelectronic Materials & Devices (COMMAD), 2014 Conference on (pp. 156-159). IEEE.
Anvari, R., Myers, M., Umana-Membreno, G. A., Baker, M., Spagnoli, D., Parish, G., & Nener, B. (2014, December).

PRESENTATIONS

Carrier dynamics in nitrogen-doped graphene under THz radiation.
In 2021 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC) (pp. 1-1). IEEE.
Anvari, R., & Dignam, M. M. (2021, June).

Anisotropic Terahertz Pump-Probe Response of Bilayer Graphene.
In 2021 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC) (pp. 1-1). IEEE.
Seidl, A., Anvari, R., Dignam, M. M., Richter, P., Seyller, T., Schneider, H., ... & Winnerl, S. (2021, June).

THz response of Nitrogen-Doped Graphene
Photonic North, 2021
Anvari, R., M. M. Dignam

Carrier dynamics in nitrogen-doped graphene under THz radiation
CLEO, 2021
Anvari, R., M. M. Dignam

Electron Transfer Between (-201) β-Ga2O3 and water
International Workshop on Gallium Oxide and Related Materials (IWGO)
University of Parma, Italy 2017
Anvari, R., Spagnoli, D., Parish, G., & Nener, B.

Effect of the surface Ga$_2$O$_3$ on the characteristics of the GaN-based Chemical Sensor
International Workshop on Gallium Oxide and Related Materials (IWGO)
University of Parma, Italy 2017
Anvari, R., Spagnoli, D., Parish, G., & Nener, B.

GaN-based Chemical Sensors: Surface Termination, Chemistry and Reaction Dynamics with Electrolytes
Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD)
University of New South Wales, Australia December 2016
Anvari, R., Spagnoli, D., Parish, G., & Nener, B.

First Principles Study of the Adsorption of Oxygen, Hydrogen and Water on the O-terminated (001) β- Ga$_2$O$_3$
International Conference on Nanoscience and nanotechnology (ICONN)
Australian National University, Canberra 2016
Anvari, R., Spagnoli, D., Parish, G., & Nener, B.

Surface Termination and Chemical Properties of the (001) Ga2O3
International Workshop on Gallium Oxide and Related Materials (IWGO)
University of Kyoto, Japan 2015
Anvari, R., Umana-Membreno, G. A., Baker, M., Spagnoli, D., Parish, G., & Nener, B.

TEACHING EXPERIENCE

University of Western Australia, 2013-2018
Semiconductor physics and devices (tutor and lab demonstrator)

University of Western Australia, 2011-2012
Digital and Embedded Systems, (tutor and lab demonstrator)
Power and Electrical Machine Technologies (tutor and lab demonstrator)
Robotics (lab demonstrator)

RESEARCH SKILLS

Computational physics
Condensed matter physics, electronic structure calculations, Optics
Semiconductor device physics
Heterostructure physics and modelling (solid-solid and solid-liquid phases)
Density functional theory and calculations
Density functional tight binding theory and calculations
Scientific programming and numerical modelling: Fortran, Matlab, Python, C++, CUDA
Finite elements and finite difference methods for multi-physics problems
Monte Carlo, Machine Learning

RESEARCH INTERESTS

2D-materials, Surfaces, Graphene
Quantum phase transition, Topological insulators
Carrier transport, Charge transfer, Scattering
Solid state physics, nonlinear optics,
Heterostructures
Liquid state physics,
Electrodes, Surface kinetics, Catalysis
GaN, Ga_2O_3, Oxides,
Wave propagation in turbulent systems
Semiconductor device physics and modelling
Machine Learning, Neural Networks

REFERENCES

Professor Marc Dignam
Queen's university
Department of Physics, Engineering Physics & Astronomy
Phone +1 613-533-6804
Email dignam@queensu.ca

Professor Brett Douglas Nener
University of Western Australia
School of Electrical, Electronics and Computer Engineering
Phone +61 8 6488 3111
Email brett.nener@uwa.edu.au

Professor Giacinta Parish
University of Western Australia
School of Electrical, Electronics and Computer Engineering
Phone +61 8 6488 3390
Email giacinta.parish@uwa.edu.au

Professor Dino Spagnoli
University of Western Australia
School of Molecular Sciences
Phone +61 8 6488 8681
Email dino.spagnoli@uwa.edu.au