

Alexandr Fonari

School of Chemistry & Biochemistry and Center for Organic Photonics and Electronics

Georgia Institute of Technology, Atlanta, GA, USA

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QUALIFICATIONS and INTERESTS

- Trained theoretical and computational physicist
- 10 years experience Fortran, C, Python, PERL, PHP
- Skilled in parallel computing (MPI, OpenMP)
- Interested in computational materials and pharma/biotech
- Involved in the development of scientific software
- Permanent resident of United States

EDUCATION

Georgia Institute of Technology

Ph.D. – Computational Physical Chemistry – GPA: 3.77/4.00

- Recipient of 2015 Center for Organic Photonics and Electronics Graduate Student Fellowship
- Co-authored 10 peer-reviewed publications

Atlanta, GA, USA

2011 – July 2015

New Mexico Highlands University

M.Sc. – Applied Chemistry – GPA: 3.88/4.00

- Co-authored 12 peer-reviewed publications

Las Vegas, NM, USA

2009 – 2011

Moldova State University

B.Sc. – Theoretical Physics – GPA: 8.40/10.00

- Instructed Computer Science I (2008)

Chisinau, Moldova

2006 – 2009

EXPERIENCE

Georgia Institute of Technology

Graduate Research Assistant

- Modeled electrical conductivity and charge-carrier mobility in organic semiconductors within multidisciplinary collaboration of 5 research groups, resulting in 2 *Nature Communications* publications
- Implemented computational screening of organic semiconductors using a combination of DFT and molecular dynamics, resulting in a *Journal of the American Chemical Society* publication, cited by 20 researchers
- Administered technical support for a research group of 15 people in compiling and exploring a wide range of electronic-structure packages (VASP, Quantum-Espresso, CRYSTAL, NWChem, Q-Chem, Gaussian, etc.) on Linux-based high-performance supercomputers: Cray and SGI

Atlanta, GA, USA

2011 – Present

New Mexico Highlands University

Graduate Research Assistant

- Provided structural characterization of materials for hydrogen storage and catalysis via single-crystal diffraction as a part of collaboration with *Los Alamos National Laboratory*
- Administered training and technical support in using Bruker SMART APEX II single-crystal diffractometer to staff and students (20+ people) of the Department of Biology and Chemistry

Las Vegas, NM, USA

2009 – 2011

Gorasoftware S.R.L.

Junior Web Developer

- Developed a complete virtual messaging system with possibilities of receiving, composing and drafting messages between users
- Messaging system is deeply integrated and was playing a key role within the parent social network

Chisinau, Moldova

2005 – 2006

SOFTWARE PROJECTS

Raman Spectra Database of Inorganic Materials

Implemented in Python using VASP as a back-end and Django database interface

- Developed Raman spectrum simulator for crystals and thin-films: [github.com/raman-sc](https://github.com/alexandrfonari/raman-sc)
- Implemented high-throughput calculation of Raman spectra of inorganic materials by combining Python/Django db module with job scheduling system (PBS/TORQUE) on cluster/supercomputer
- The implementation employs client-server approach, is highly portable and has a simple stop/restart functionality, important for busy supercomputer environment

Georgia Tech

2014 – Present

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SOFTWARE PROJECTS CONTD.

First-principles evaluation of the electron coupling in condensed phase morphology

Georgia Tech

Implemented in Fortran and Python

2013 – 2014

- Developed a highly parallel implementation of the electronic coupling evaluation in the NWChem package
- Implemented automated workflow to: extract geometries from molecular dynamics snapshots, calculate electronic couplings and compute statistics using Python/numpy/scipy
- Results obtained using this implementation are published in several peer-reviewed publications:
[10.1002/chem.201303308](https://doi.org/10.1002/chem.201303308), [10.1021/cm503439r](https://doi.org/10.1021/cm503439r)

-
- Extended Software Development Workshop* at CECAM-EPFL (Summer 2014, Lausanne, Switzerland)
 - Interfaced the libspio library (C) with the Quantum-ESPRESSO package (Fortran): modified autoconf/Makefile, developed suitable (C) interface, modified Fortran code to call C functions ([Github](#))
 - Advanced Quantum-ESPRESSO Developer Training* at SISSA (Winter 2013, Trieste, Italy)
 - Converted legacy module of Quantum-ESPRESSO package (Fortran) to the current version: team of 12 people, 10 days, 10k lines of code

MOST SIGNIFICANT PUBLICATIONS

- A. A. Bakulin, R. Lovrincic, Y. Xi, O. Selig, H. J. Bakker, Y. L.A. Rezus, P. K. Nayak, **A. Fonari**, *et al.*, “Mode-selective vibrational modulation of charge transport in organic electronic devices”, *Nature Communications* (2015): *accepted* ([arXiv/1503.00777](#))
- K. Goetz, **A. Fonari**, *et al.*, “Freezing-in Orientational Disorder Induces Crossover from Thermally Activated to Temperature-Independent Transport in Organic Semiconductors”, *Nature Communications* (2014): [10.1038/ncomms6642](https://doi.org/10.1038/ncomms6642)
- A. Fonari** *et al.*, “Impact of Exact Exchange in the Description of the Electronic Structure of Organic Charge-Transfer Molecular Crystals”, *Physical Review B* (2014): [10.1103/PhysRevB.90.165205](https://doi.org/10.1103/PhysRevB.90.165205)
- S. K. Mohapatra, **A. Fonari**, *et al.*, “Dimers of Nineteen-Electron Sandwich Compounds: Crystal and Electronic Structures, and Comparison of Reducing Strengths”, *Chemistry – A European Journal* (2014): [10.1002/chem.201404007](https://doi.org/10.1002/chem.201404007). [Back cover](#)
- L. Zhang, **A. Fonari**, *et al.*, “Bistetracene: An Air-Stable, High-Mobility Organic Semiconductor with Extended Conjugation”, *Journal of the American Chemical Society* (2014): [10.1021/ja503643s](https://doi.org/10.1021/ja503643s). [Front cover](#)
- A. Fonari** *et al.*, “On Justification of Cu(II) Environment in Mononuclear Complexes: Joint X-ray and AIM Studies”, *Polyhedron* (2011): [10.1016/j.poly.2011.04.002](https://doi.org/10.1016/j.poly.2011.04.002)

★ **Total: 21 peer-reviewed publications, cited 122 times:** [Google Scholar profile](#)

ORAL PRESENTATIONS

- A. Fonari** *et al.*, “Joint Mean-Field and Ab Initio Study of the Exciton Dynamics Due to Low-Energy Phonons in Rubrene Single Crystal”, *Materials Research Society (MRS) Fall Meeting*, Nov. 30-Dec. 5, 2014, Boston, MA, USA
- A. Fonari** *et al.*, “The Impact of Exact Exchange Energy in Describing the Charge-Transport Properties in Organic Charge-Transfer Semiconductors”, *International Conference on the Physics of Semiconductors (ICPS)*, Aug. 10-15, 2014, Austin, TX, USA

THESES

- Ph.D.** Thesis: “Theoretical Description of Charge Transport and Exciton Fission in Single-Component and Bimolecular Charge-Transfer Organic Semiconductors”, advisors: Veaceslav Coropceanu and Jean-Luc Bredas, *in preparation*
- M.Sc.** Thesis: “X-Ray Diffraction and Computational Studies of Materials for Photonics and Electronic Applications”, advisors: Mikhail Yu. Antipin and Tatiana V. Timofeeva
- B.Sc.** Thesis: “Theoretical Investigations of Crossover Effects in Fe(II) Ions”, advisor: Sophia I. Klokishner