

Georgii Bogdanov

Personal information

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Legal status: U.S. lawful permanent resident

Education

- 2019 – 2024** Department of Chemical and Biomolecular Engineering, University of California Irvine, California, USA
- Ph.D. «Chemical and Biomolecular Engineering » (*Summer 2024*)
Advisor – Gorodetsky A.A.
- 2019 – 2022** Department of Chemical and Biomolecular Engineering, University of California Irvine, California, USA
- M.S. «Chemical and Biomolecular Engineering »,
Advisor – Gorodetsky A.A.
- 2017 – 2019** Department of Chemistry, New Mexico Highlands University, New Mexico, USA
- M.S. «Chemistry», Advisor – Timofeeva T.V.
- 2016 – 2018** School of laser and light engineering, Department of IT in the Fuel and Energy Industry, ITMO University, Saint-Petersburg, Russia
- M.S. «Laser Engineering and Laser Technologies»,
Advisor – Denisyuk I.Y.
- 2012 – 2016** School of optical-information systems and technologies, Department of optoelectronic instrumentation and systems, ITMO University, Saint-Petersburg, Russia
- B.S. «Optical engineering», Advisor – Gorbachev A.A.

Research experience

- 2019 - present** Studying optical properties of skin tissues and single cells, engineering human living cells with specific properties for biomedical applications
- 2017 - 2019** Synthesis and analysis of crystal structures (cocrystals and monocrystals), development of a setup for crystal growth from vapor phase
- 2016 - 2017** Modification of polymer materials surfaces by reactive ion etching for biodegradability
- 2012 - 2016** Developing of the optical system to control deformations of oversized objects

Work experience

- June 2019 – present** **Graduate research assistant**
Gorodetsky Group, University of California Irvine, Irvine, CA, USA
- Genetic engineering of human living cells with specific properties for various applications
 - Establishing experimental protocols and assays for characterization of live engineered human cells
 - Expressing various proteins in human cells
 - Characterizing optical and electronic properties of human living cells
 - Developing custom cell culture methods
 - Utilizing engineered mammalian cells for biomedical applications
 - Leading the cell engineering research subgroup
 - Preparation and submission of proposals for federal grants
- August 2017 – June 2019** **Graduate research assistant**
Department of Chemistry, New Mexico Highlands University, Las Vegas, NM, USA
- Synthesis of drug-based, organic electronic and photonic single and co-crystals
 - Crystallographic studies of drug-based, organic electronic and photonic single and co-crystals
 - Development of new laboratory equipment for organic crystal growth
 - Technical support of X-ray diffraction instrumentation and other research equipment
 - Teaching assistant
- August 2016 – August 2017** **Engineer**
Department of Radiology, Military Medical Academy named by S.M.Kirov, Saint-Petersburg, Russian Federation.
- Technical support of medical equipment – X-ray, MRI tomographs, CT scanners
 - Collaborating with Siemens, Philips, GE on equipment manufacturing and support
 - Technical documentation
- July 2015 – August 2016** **Engineer**
«Group of Optical and Technical Companies» LLC., Saint-Petersburg, Russian Federation.
- Manufacturing of optical and optical-electronic equipment
 - Assembling optical microscopes in accordance with technical description
 - Preparation of technical documentation for produced equipment
 - Participation in auctions of public procurement, preparation of documentation, communication with customers
 - Development of the corporate website
- May 2013 – June 2015** **Media designer**
National Research University of Information Technologies, Mechanics and Optics (ITMO University), Saint-Petersburg, Russia
- Preparation and conducting media support of the events
 - Configuring and debugging computer networks
 - Work with sets of organizational and administrative documentation
 - Light director (September 2014 – June 2015)
 - Sound director (May 2013 – September 2014)
 - 3D motion, computer graphics, video production

Teaching experience

- Fall 2020** **Head Teaching Assistant – Engineering 1A: General Chemistry for Engineers**
Department of Chemical and Biochemical Engineering
University of California Irvine, California, USA
- Taught lecture to 140 freshmen students at School of Engineering
 - Taught discussion section to 50 freshmen students at School of Engineering
 - Consulting students twice a week
 - Recorded lecture materials, prepared exams, quizzes and homework assignments for the course
 - Grading exams and quizzes
- Fall 2019** **Reader – Engineering 1A: General Chemistry for Engineers**
Department of Chemical and Biochemical Engineering
University of California Irvine, California, USA
- Taught discussion section to 35 freshmen students at School of Engineering
 - Consulting students twice a week
 - Grading exams and quizzes
- Spring 2019** **Teaching assistant – CHEM 1225: General Chemistry II**
Department of Chemistry
New Mexico Highlands University, California, USA
- Taught lab to 20 upper-division biology and chemistry majors
 - Consulting students twice a week
 - Grading lab reports
- Fall 2018** **Teaching assistant – CHEM 1215: General Chemistry I**
Department of Chemistry
New Mexico Highlands University, California, USA
- Taught lab to 20 upper-division biology and chemistry majors
 - Consulting students twice a week
 - Grading lab reports

Publications

- Bogdanov, G.**, Chatterjee, A., Makeeva, N., Farrukh, A. & Gorodetsky, A. A. (2023). Squid leucophore-inspired engineering of optically dynamic human cells. *iScience*, **26**(7), 106854. <https://doi.org/10.1016/j.isci.2023.106854>
- Bogdanov, G.**, Oskolkov, E., Bustos, J., Glebov, V., Tillotson, J. P., & Timofeeva, T. V. (2020). Molecular and crystal structure, optical properties and DFT studies of 1,4-dimethoxy-2,5-bis[2-(4-nitrophenyl)ethenyl]benzene. *Acta Crystallogr.* **E76**(6), 940–943. <https://doi.org/10.1107/s205698902000674x>
- Bogdanov, G.**, Bustos, J., Glebov, V., Oskolkov, E., Tillotson, J. P., & Timofeeva, T. V. (2020). Molecular and crystal structure, lattice energy and DFT calculations of two 2'-(nitrobenzoyloxy)acetophenone isomers. *Acta Crystallogr.* **E76**(6), 857–861. <https://doi.org/10.1107/s2056989020006295>
- Bogdanov, G.**, Tillotson, J. P., Khrustalev, V. N., Rigin, S., & Timofeeva, T. V. (2019). Synthesis and structural study of organic two-photon-absorbing cycloalkanone chromophores. *Acta Crystallogr.* **C75**(11), 1554–1561. <https://doi.org/10.1107/s2053229619014360>
- Bogdanov, G.**, Tillotson, J. P., & Timofeeva, T. (2019). Crystal structures, syntheses, and spectroscopic and electrochemical measurements of two push–pull chromophores: 2-[4-(dimethylamino)benzylidene]-1H-indene-1,3(2H)-dione and (E)-2-{3-[4-(dimethylamino)phenyl]allylidene}-1H-indene-1,3(2H)-dione. *Acta Crystallogr.* **E75**(11), 1595–1599. <https://doi.org/10.1107/s205698901901329x>
- Bogdanov, G.**, Tillotson, J. P., Khrustalev, V. N., Rigin, S., & Timofeeva, T. V. (2019). Synthesis, crystal structure studies and solvatochromic behaviour of two 2-{5-[4-(dimethylamino)phenyl]penta-2,4-dien-1-ylidene}malononitrile derivatives. *Acta Crystallogr.* **C75**(8), 1175–1181. <https://doi.org/10.1107/s2053229619010398>
- Bogdanov, G.**, Tillotson, J. P., Bustos, J., & Timofeeva, T. V. (2019). Synthesis and structure of push–pull merocyanines based on barbituric and thiobarbituric acid. *Acta Crystallogr.* **E75**(9), 1306–1310. <https://doi.org/10.1107/s2056989019011071>
- Bogdanov, G.**, Tillotson, J. P., Bustos, J., Fonari, M. & Timofeeva, T.V. (2019). Crystal structure of tetramethylammonium 1,1,7,7-tetracyanohepta-2,4,6-trienide. *Acta Crystallogr.* **E75**, <https://doi.org/10.1107/S2056989019011411>
- Ashfaq, M., **Bogdanov, G.**, Ali, A., Tahir, M. N., & Abdullah, S. (2021). Pyrimethamine-Based Novel Co-Crystal Salt: Synthesis, Single-Crystal Investigation, Hirshfeld surface analysis and DFT inspection of the 2,4-diamino-5-(4-chlorophenyl)-6-ethylpyrimidin-1-ium 2,4-dichlorobenzoate (1:1) (DECB). *J. Mol. Struct.*, 130215. <https://doi.org/10.1016/j.molstruc.2021.130215>
- Ashfaq, M., **Bogdanov, G.**, Glebov, V., Ali, A., Tahir, M. N., & Abdullah, S. (2020). Single Crystal Investigation, Hirshfeld Surface Analysis and DFT Exploration of the Pyrimethamine-Based Novel Organic Salt: 2, 4-diamino-5-(4-chlorophenyl)-6-ethylpyrimidin-1-ium 3-carboxybenzoate hydrate (1:1:1). *J. Mol. Struct.*, 129309. <https://doi.org/10.1016/j.molstruc.2020.129309>
- Tillotson, J. P., **Bogdanov, G.**, Jucov, E. V., Khrustalev, V. N., Rigin, S., Hales, J. M., ... Timofeeva, T. V. (2019). Synthesis, structure, linear and nonlinear properties of tricyanofuran–terminated merocyanine dyes. *J. Mol. Struct.* **1189**, 146–154. <https://doi.org/10.1016/j.molstruc.2019.04.001>
- Ashfaq, M., Tahir, M. N., **Bogdanov, G.**, Ali, A., Ahmed, M., Ahmed, G., Abbas, A. (2023). Crystal structure, supramolecular assembly exploration by Hirshfeld surface analysis and DFT inspection of the

synthesized functionalized crystalline anilide. *J. Iran. Chem. Soc.* **19**, 3147-3159. <https://doi.org/10.1007/s13738-023-02904-9>

Ashfaq, M., Munawar, K. S., **Bogdanov, G.**, Ali, A., Tahir, M. N., Ahmed, G., Ramalingam, A., Alam, M. M., Imran, M., Sambandam, S., & Munir, B. (2022). Single crystal inspection, Hirshfeld surface investigation and DFT study of a novel derivative of 4-fluoroaniline: 4-((4-fluorophenyl)amino)-4-oxobutanoic acid (BFAOB). *J. Iran. Chem. Soc.* **19**, 1953–1961. <https://doi.org/10.1007/s13738-021-02432-4>

Mohapatra, S. K., Kurdi, K. A., Jhulki, S., **Bogdanov, G.**, Bacsá, J., Conte, M., Timofeeva, T. V., Marder, S. R., Barlow, S. (2023). Benzoimidazolium-derived dimeric and hydride n-dopants for organic electron-transport materials: impact of substitution on structures, electrochemistry, and reactivity. *Beilstein J. Org. Chem.* **19**(1), 1651-1663. <https://doi.org/10.3762/bjoc.19.121>

Rigin, S., Tillotson, J., Perry, J., Khrustalev, V. N., **Bogdanov, G.**, & Timofeeva, T. V. (2019). Polymorphism of Merocyanine Dyes Homologues with 1,3-Diethyl-2-thiobarbituric Acid Acceptor and p-Dimethylaminobenzene Donor and Different Polymethine Chains Connecting Them. *Crystal Growth & Design*, **20**(1), 167–177. <https://doi.org/10.1021/acs.cgd.9b00961>

Ashfaq, M., Tahir, M. N., Muhammad, S., Munawar, K. S., Ali, A., **Bogdanov, G.**, & Alarfaji, S. S. (2021). Single-crystal investigation, Hirshfeld surface analysis, and DFT study of third-order NLO properties of unsymmetrical acyl thiourea derivatives. *ACS Omega*, **6**(46), 31211–31225. <https://doi.org/10.1021/acsomega.1c04884>

Publications in progress

Bogdanov, G., Strzelecka, A.A., Kaimal, N., Senft, S., Hanlon, R.T., Gorodetsky, A.A. Gradient Refractive Indices Drive Cephalopod Structural Coloration And Enable Bioinspired Multispectral Materials. *Science. In Revision.*

Farrukh, A., Chatterjee, A., **Bogdanov, G.**, Berlin, D. & Gorodetsky, A.A. Cephalopod-Inspired Bioelectronic Control of Extracellular Vesicle Production. *Cell. In Submission.*

Conference publications

Bogdanov, G., Timofeeva, T. (2018). Growth of Different Cocrystal Conformation by Vapor Deposition. Flogen Star Outreach, 6, 389-390. <https://www.flogen.org/sips2018/paper-6-416.html>

Bogdanov, G., Rigin, S., Gallegos, G., & Timofeeva, T. V. (2018). Custom setup for organic crystal growth by vapor deposition. *Acta Crystallogr.* **A74**(a1), a311–a311. <https://doi.org/10.1107/s0108767318096897>

Rigin, S., **Bogdanov, G.**, Fonari, M., & Timofeeva, T. V. (2018). Computational analysis of charge-transfer crystalline complexes. *Acta Crystallogr.* **A74**(a1), a310–a310. <https://doi.org/10.1107/s0108767318096903>

Patents

Gorodetsky, A. A.; Farrukh, A.; Chatterjee, A.; **Bogdanov, G.** “Cephalopod-Inspired Bioelectronic Platform for Engineering Intercellular Communication.” Application No. 2021-779-1. Disclosed February 10th, 2021.

Total citations as of March 07, 2024: 182.

Selected press

March 27, 2023 – Human cells help researchers understand squid camouflage. **American Chemical Society News**. <https://www.acs.org/pressroom/newsreleases/2023/march/human-cells-help-researchers-understand-squid-camouflage.html>

March 27, 2023 – Human cells help researchers understand squid camouflage. **American Chemical Society Meeting Newsroom (YouTube)**. <https://youtu.be/uU4wrA4QeF8?si=dYjs15tmA4SrlZDo>

March 29, 2023 – Ученые исследуют камуфляж кальмаров при помощи клеток человека. **InScience (Russia)**. <https://inscience.news/ru/article/world-science/biology/11990>

April 3, 2023 – Des chercheurs confèrent des capacités de camouflage par transparence à des cellules humaines. **Trust my Science (France)**. <https://trustmyscience.com/equipe-confere-capacites-camouflage-cellules-humaines/>

April 4, 2023 – Scienziati creano cellule umane con la capacità di mimetizzarsi dei calamari. **EveryEye (Italy)**. <https://tech.everyeye.it/notizie/scienziati-creano-cellule-umane-capacita-mimetizzarsi-calamari-643263.html>

April 5, 2023 – Células humanas modificadas para imitar las de la piel del calamar podrían revelar la clave del camuflaje. **Wired**. <https://es.wired.com/articulos/celulas-humanas-modificadas-que-imitan-celulas-de-piel-de-calamar-para-camuflaje>

April 7, 2023 – 인간 세포에 오징어 단백질 이식, 투명화에 성공. **TechTube (Korea)**. <https://www.techtube.co.kr/news/articleView.html?idxno=3207>

April 10, 2023 – Onderzoekers schenken menselijke cellen de camouflage-eigenschappen van inktvis. **NewsBeezer (Belgium)**. <https://newsbeezer.com/belgium/onderzoekers-schenken-menselijke-cellen-de-camouflage-eigenschappen-van-inktvis/>

Conferences

- November 26 – December 1, 2023**
Boston, MA, USA CEPHALOPOD-INSPIRED OPTICAL ENGINEERING OF MAMMALIAN CELLS // **G. Bogdanov**, N. Kaimal, A. Farrukh, A. Strzelecka, A. Chatterjee, A. A. Gorodetsky / 2023 *MRS Fall Meeting* / Oral presentation
- April 10-14, 2023**
San Francisco, CA, USA DYNAMIC OPTICAL MATERIALS INSPIRED BY CEPHALOPODS // N. Kaimal, **G. Bogdanov**, A. Farrukh, A. A. Gorodetsky / 2023 *MRS Spring Meeting* / Oral presentation
- March 26-30, 2023**
Indianapolis, ID, USA DYNAMIC OPTICAL SYSTEMS INSPIRED BY CEPHALOPODS // **G. Bogdanov**, N. Kaimal, A. Farrukh, A. Chatterjee, A. A. Gorodetsky / 2023 *ACS Spring* / Oral presentation, press release
- November 27 – December 2, 2022**
Boston, MA, USA DYNAMIC OPTICAL SYSTEMS INSPIRED BY CEPHALOPODS // **G. Bogdanov**, N. Kaimal, A. Chatterjee, A. Farrukh, A. A. Gorodetsky / 2022 *MRS Fall Meeting* / Oral presentation
- August 21-22, 2022**
San Diego, CA, USA [INVITED] DYNAMIC MATERIALS INSPIRED BY CEPHALOPODS // A. A. Gorodetsky, **G. Bogdanov** / *SPIE Vol. 12210, Organic and Hybrid Sensors and Bioelectronics XV* / Oral presentation
- June 26 – July 1, 2022**
Newport, RI, USA DYNAMIC BIOPHOTONIC SYSTEMS INSPIRED BY CEPHALOPODS // **G. Bogdanov**, A. Chatterjee, N. Kaimal, A. Farrukh, A. A. Gorodetsky / 2022 *Gordon Research Conference: BioAnalytical Sensors* / Poster
- June 12-17, 2022**
Barga, Italy DYNAMIC MATERIALS INSPIRED BY CEPHALOPODS // **G. Bogdanov**, A. A. Gorodetsky / 2022 *Gordon Research Conference Biointerface Science* / Poster
- November 28 – December 2, 2021**
Boston, MA, USA REFLECTIN-BASED OPTICAL STRUCTURES IN HUMAN CELLS // **G. Bogdanov**, A. A. Gorodetsky / 2021 *MRS Fall Meeting* / Oral presentation
- November 27 – December 4, 2020**
Virtual CEPHALOPOD-INSPIRED OPTICAL ENGINEERING OF HUMAN CELLS // A. Farrukh, A. Chatterjee, **G. Bogdanov**, A. A. Gorodetsky / 2020 *MRS Virtual Spring/Fall Meeting, Online Only* / Oral presentation
- November 13-16, 2019**
El Paso, TX, USA SOLID-STATE STRUCTURAL STUDY OF FLUORO-SUBSTITUTED DERIVATIVES OF 2-METHYL-2-PHENYLPROPIONAMIDE // M. I. Barron-Gonzalez, V. Sena, **G. Bogdanov**, T. V. Timofeeva, A. V. Krivoshein / *ACS 2019 Southwest Regional and Rocky Mountain Regional Meeting* / Poster
- November 13-16, 2018**
Moscow, Russia STRUCTURE AND PROPERTIES OF NEW PUSH-PULL MOLECULES // **G. Bogdanov**, J. P. Tillotson, J. Perry, T. V. Timofeeva / *International Workshop on Chemical Crystallography and Structural Biology ("The Second Struchkov Meeting")* / Oral presentation
- November 4-8, 2018**
Rio de Janeiro, Brazil GROWTH OF DIFFERENT CONFORMATION BY VAPOR DEPOSITION // **G. Bogdanov**, T. V. Timofeeva / 2018 *Sustainable Industrial Processing Summit and Exhibition* / Oral presentation
- October 26, 2018**
Albuquerque, NM, USA STRUCTURE AND PROPERTIES OF NEW PUSH-PULL MOLECULES // **G. Bogdanov**, J. P. Tillotson, J. Perry, T. V. Timofeeva / *ACS Rocky Mountain Regional Meeting* / Oral presentation

X-RAY AND DFT STUDIES OF NOVEL THIOBARBITURIC CHROMOPHORES WITH NONLINEAR OPTICAL PROPERTIES // S. Rigin, **G. Bogdanov**, T. V. Timofeeva, J. P. Tillotson / *ACS Rocky Mountain Regional Meeting* / Poster presentation

July 20-24, 2018
Toronto, Canada

CUSTOM SETUP FOR ORGANIC CRYSTAL GROWTH BY VAPOR DEPOSITION // **G. Bogdanov**, S. Rigin, Gil Gallegos, T. V. Timofeeva / *American Crystallographic Association Annual Meeting* / Oral presentation

November 4, 2017
Albuquerque, NM,
USA

CUSTOM SETUP FOR HIGH-QUALITY ORGANIC SEMICONDUCTOR CRYSTAL GROWTH // E. Oskolkov, **G. Bogdanov**, S. Rigin, G. Gallegos / *New Mexico Academy of Science 2017 Research Symposium* / Poster presentation

Grants and awards

1. Division of Teaching Excellence and Innovation Graduate Fellowship, \$5000, July 2020
2. Medal “For the contribution to crystallography”, Struchkov Prize Association, November 2018
3. International program fellowship, ITMO University, \$6000, 2017-2018
4. Scholarship of the ITMO University’s Academic Council for merit in public activities, Saint-Petersburg, Russia, \$5000, 2013-2015

Additional education

1. ACA Summer course in Chemical Crystallography, American Crystallographic Association, University of Notre Dame, South Bend, Indiana, USA, 2018
2. Professional development courses «Human Resource Management», RANEPa, Saint-Petersburg, Russia, 2015
3. Change the World Model United Nations (international educational conference dedicated to the discussion about global problems of modern society), New York, USA, 2014

Skills

- Computer skills:**
- LabVIEW, MATLAB, Python
 - Physics simulations COMSOL, Optical simulation OPAL, Zemax
 - MS Office, Autodesk Inventor, SolidWorks
 - Cinema 4D, 3D MAX, DaVinci Resolve
 - Adobe: After Effects, Premiere Pro, Illustrator, Photoshop

Laboratory: Cell biology, molecular biology, protein expression, assay development, biochemistry, polymer chemistry, biomaterials, IF, HT, XRD, FTIR, SEM, TEM, NMR, MRI, CT

Languages: Russian – native, English – fluent, French – intermediate

- Personal qualities and skills:**
- Focusing on results
 - Excellent communication skills
 - Critical thinking
 - Fast learner
 - Creativity
 - Adaptability