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WORK EXPERIENCE

Graduate Researcher *01/2022 - present*

Superv. Prof. Artem R. Oganov *A.Oganov@skoltech.ru*
Skoltech (Skolkovo Institute of Science & Technology) / IPG Photonics

- Nonlin. Optical (NLO) Crystals w/ computat. & experim. methods

Undergraduate Research Assistant *01/2019 - 08/2021*

NanoTech Institute; Superv. Prof. Anvar A. Zakhidov *zakhidov@utdallas.edu*
University of Texas at Dallas, Richardson, TX (United States)

- Current & Recent work:
  - I. Carbon Nanotubes (CNT) synthesis, analysis and characterization. Currently interested in the parameter effects on spinnability through chemical-vapor deposition (CVD) production method.
  - II. Optical study and characterization of single-walled & multi-walled CNTs.
  - III. E-Beam Substrate Thickness & Tooling Factor Relation study
  - IV. Spinnability, Areal Density, Area by Volume & comparison to other 2D and 1D materials with Carbon Nanotubes.
  - V. CNT Yarns & Twistrons, & magnetic resistance measurements of free-standing, densified, and twisted or coiled CNTs coated in NbTi layer. The collaborative project includes CNTs along with other materials such as PVA, and carbon fibers, to create superconductive nanowires for applications in the magnets and possibly chip-interconnects.
  - VI. Morphological analysis of the CNTs and other materials (mainly focusing on the surface defects & density using the SEM, Tensile Strength measurements, & studies via UV-Vis).
  - VII. Comparison of growth catalysts using the evaporated E-beam sputtering versus dip-coating or spin-coating methods to observe the influence of thickness and coating methods on the production quality. The intent is to find an efficient possible substitution (simpler method) for catalyst deposition for cost-efficiency.
  - VIII. CVD for nanoparticle-based binary/bimetallic catalysts. Using dip-coating and spin-coating techniques for the catalyst consisting of amorphous aluminum-oxide nanoclusters embedded over Fe_3O_4 crystalline nanoparticles. The resulting growth morphology is assessed in an attempt to predict the morphological tendencies at varying chamber temp. and reac. times over Si, SiO_2, & other substrates for possible spinnable growth formulations.
  - IX. Manufacturing spinnable CNTs for future collaboration with the Instituto Potosino de Investigación Científica y Tecnológica, México; Rice University, Houston; and ITMO, St. Petersburg groups. Manufacturing non-spinnable sets of CNTs with varying target defects/deformations for MISiS.
  - X. Highly-efficient acid-doped MWCNTs for optoelectronic application

- Previous background:
  - I. Non-organic Halide Perovskite LED device manufacturing.
  - II. Quantum dot and perovskite quantum dot thin film fabrication.
  - III. Spectroscopy, electroluminescence and photoluminescence

analysis of the various light-emitting devices.

IV. Mixed-halide perovskite quantum dots
V. Perovskite-QDs-infused opals

Baylor Surgical Hospital Volunteer *2015 - 2018*
Surgical Hospital at Las Colinas, Irving, TX (United States) *+1 972 868 4000*
Advisors: John Vo

- Tasks: Full management of Waiting Room 1; supply coordination management including procedure rooms; reception/registration desk; communications facilitator; basic patient care.

PUBLICATIONS

I. * Approved on *4/22/2021** *12/2020*

- Title: "*Improving the electrochemical performance of flexible carbon nanotubes based supercapacitors by depositing Ni@TiO2:W nanoparticles on their anodes*".
- Journal: *Journal of Physics & Chemistry of Solids*
- Role: Co-Author - Synthesis & characterization of CNTs, device preparation help, photonic measurements, etc. as a member of University of Texas at Dallas (Dr. Anvar Zakhidov group) in collaboration with Instituto Potosino de Investigación Científica y Tecnológica A.C. (Dr. Jorge Oliva UC group).

II. * Commented edits requested *01/2022 - present*

- Title: "*Efficient NO2 detection and the sensing mechanism of stretchable/biodegradable MWCNT based sensors decorated with CeO2 nanoparticles*".
- Journal: *Synthetic Metals*
- Role: Co-Author - Synthesis of specific parameter CNTs and more as a member of University of Texas at Dallas (Dr. Anvar Zakhidov group) in collaboration with Instituto Potosino de Investigación Científica y Tecnológica A.C. (Dr. Jorge Oliva UC group).

EDUCATION (& EXTERNAL COURSES)

1st Yr. MSc Materials Science (current) *09/2021 - present*
Skoltech (Skolkovo Institute of Science & Technology)

- Official focus - Computational MS program. Course focus on Computational & Experimental (hybrid) Materials Science curriculum
- IPG Photonics program participant (training track courses added)

Bachelors of Science in Physics Major *02/2016 - 02/2021*
University of Texas at Dallas, Richardson, TX (United States)

- Physics (BS) Major

Online Summer School of Metamaterials and Nanophotonics (METANANO) *07/2020*
University of Informational Technologies, Mechanics and Optics (ITMO) - Saint Petersburg, Russia

- 3 ECTS credits earned (1.8 US Credits) from graduate-level photonics and nanomaterials fast-paced program.

Online 4-Day Introduction to Photovoltaics Course *11/2020*
University of Informational Technologies, Mechanics and Optics (ITMO) - Saint Petersburg, Russia

- Informal fast-paced course on PV, solar energy, relevant data & basics.

Online Summer School on Photonics of 2D Materials (METANANO) *07/2021*
University of Informational Technologies, Mechanics and Optics (ITMO) - Saint Petersburg, Russia

SKILLS & BACKGROUND

- Research Characterization:
  > SEM, EDAX, AFM, Raman Spectroscopy, Instron Tensile Analyzer, E- Beam Evaporator; Cleanroom.

- Materials Science:
  > CNT fabrication & characterization, MWCNT production by CVD method on both manual and automatic mode furnaces, SWCNT & MWCNT forest densification & analysis, laminating, spray-deposition by Gas-Assisted Spray-Forming (GASF) method, CNT yarns, substrate preparation & thin film catalyst E-beam; Cleanroom & other labs.

- Photonics/ Spectral Analysis:
  > Electroluminescence & Photoluminescence Spectroscopy, Raman Spectroscopy, Metal Deposition, UV-Vis, X-Ray Crystallography, Spin-Coating, Thin-Films; Cleanroom & other labs.

- Computational: Basic MATLAB coding background. Learning VASP & USPEX

- Languages: English (proficient, incl. scientific literature background), Russian (proficient), Arabic (moderate), French (beginner).

LEADERSHIP (organizational/ managerial)

- Host of the past research correspondence *08/2020 - 07/2021*
  > Mathematics Department - Target Task: Topological model of the unique vertically-aligned growth of CNT forest fibers.

- Officer: The Society of Physics Students (SPS)
  > Secretary *02/2019 - 06/2021*
  > Information Communications & Outreach *08/2018 - 12/2019*
  > Spokesperson/representative of the Society of Physics Students to the community and at Graduate Students in Physics meetings, organizational records, survey & forms management, lab tours coordinator, advertisement and fliers, event planning (award winning Escape Room published in the *Society of Physics Students National Journal* September, 2020).

PROJECTS

- *NLO-based types of novel crystals research & prediction using Venetian Ab-initio Simulation Program (VASP) & other techniques - new proj. for thesis* *02/2022*
- *Spray Deposition of Carbon Nanofibers with the Perovskite Quantum Dots* - Carbon nanotube fibers and yarns spray-coated in PV-QD's. Positive results and future work outlook. Currently, the project is picked up for further experimentation and modifications based on existing data. *2019, 2020*

- *Mixed Halide Perovskite Thin Films: The Interaction of AVA with CsBr with CsBr against PbBr2* - overall experimental procedure of thin film manufacturing and analysis through EL measurements data and conditions modification. ***2019***
- *Light Absorption Properties in Various Types of CNTs* - a Physical Measurements Lab course project in collab. with Dr. Anvar Zakhidov's lab. ***2020***
- *Analog LED Current-Sense Amplifier* - under supervision of senior researcher, designing an analog constant current amplifier for implementation as a driver to the LED. This will be a helpful tool for our perovskites research laboratory. The research was not completed due to COVID (lack of resource access). ***2020***
- *Four-function Calculator with an Arduino* - an electronics design project where grids of push-button switches are employed to display the output on LCD. This was a group project where my participation was mainly involving the implementation of the design and testing Instrumentation for defects. ***2019***
- *Understanding Kalman Filter* - background research, current & potential applications through algorithmic analysis. This project also demonstrated its application in everyday university use (the Starship robot machines delivering groceries or supplies on campus). ***2019***
- *Synthesis of Multi-Walled Carbon Nanotube (MWCNT) forests based on the Quartz substrate* - Research manuscript in progress. A detailed exploration of the advantages, and characteristic differences from the conventional silicon-based forests. ***2020***
- *The Study of Morphology & Optical Characteristics of Carbon Nanotubes Through UV-Vis & Raman Profile Analysis* - a final Physical Measurements Laboratory course project with the target of demonstrating the basics of CNTs as materials with interesting properties. This yielded a new finding in the CNTs that provided sustenance for an expandable new research. ***2020***

RELEVANT CONFERENCES

-METATANO 2020: International Conference on Metamaterials & Nanophotonics (Online from St. Petersburg and other universities. Organized by University of Informational Technology, Mechanics and Optics - ITMO). ***09/2020***

-SPIE Optics + Photonics Digital Forum (in 2 parts) ***08/2020 - 09/2020***

-Oxford Instruments: Low Electron Temperatures for New Materials Characterization (Online from the UK). ***11/2020***

-International Conference on Advances and Challenges in Perovskite and Organic Solar Cells (Held online. Organizers - Yuktan Technologies Pvt. Ltd. & GED Biomedical Innovations AB). ***01/2021***
