

**Dennis D. Fernandes, PhD. Physics, MBiotech**

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**SUMMARY OF QUALIFICATIONS & SKILLS:**

- Strong knowledge/hands-on experience of advanced concepts in **biophysics, optics, medical imaging, biotechnology, biomanufacturing, statistics, mathematics, pharmacology, drug discovery & research strategy.**
- Ability to present and explain complex concepts to audiences with varying backgrounds with **course instructor teaching and mentorship experience.**
- Part-time Senior Physics/Biotech Lecturer at the University of Toronto, for first year and upper year undergraduate students.
- Experience with **molecular biology & biochemical techniques** (i.e., plasmid technologies, cell culture, expressions/purification)
- Project management experience **leading & developing software development (python, MATLAB, LABVIEW)**, as well as leading the design, implementation, supervision of protein expression/labeling, and commercialization.
- Experience with **digital innovation, i.e., cloud-based platforms, and data analytics/visualization** tools using **Microsoft Excel, PowerBI, and python.**
- **Exceptional oral & written communication skills**, through international scientific conferences, & **5 co-authored publications.**
- **Innovative team player, data-driven, goal-oriented, dedicated** and highly **motivated** individual accustomed to a fast-paced and dynamic work environment, **with strong knowledge of AI & ML.**
- Experience in leading strategy, designing, and execution of projects with **cross-functional** teams and **collaborators (R&D, marketing, regulatory affairs, medical, business operations).**
- Exceptional industry project/business management experience, leadership, mentorship, teaching, **collaborative**, critical thinking, budgeting/planning/forecasting, **problem-solving, data strategy & analysis** and **time-management skills** acquired over 8+ years of experience.
- **Entrepreneurial mindset:** Experience in digital innovation, marketing, market access, forecasting, business, commercialization, and R&D in both designing & execution projects.



**EDUCATION:**

**PhD, Physics:** (University of Toronto) **2014-2021**

- **Biophysics:** G Protein-Coupled Receptors Signalling Dynamics; theranostic nanoparticle development, both using fluorescence spectroscopy, and imaging modalities.

**Master of Biotechnology:** (University of Toronto) **2021-2023**

- **Biopharmaceutical Stream:** Drug discovery, biotechnology, biomanufacturing, Medical Devices, marketing, business, economics, management, commercialization & entrepreneurship

**Honors Bachelor of Science Degree:** (University of Toronto) **2009–2014**

- **Double Major:** Physics & Chemistry; **Minor:** Mathematics

## CERTIFICATIONS:

**Microsoft Azure Certified—AZ900:** Microsoft Azure Fundamentals

**Microsoft Azure 104 Administrator Bootcamp—Humber College**

## INDUSTRY EXPERIENCE:

**Lead, Business Analytics & Insights:** Sanofi

**Jan 2023-Dec2023**

- Support and lead annual strategic/long-range planning process jointly with **Finance**, and in-depth review of franchise/TA, as needed, by leading the build of **PowerBI dashboards**.
- Manage the environmental/market assessment process; work with Global Business Operations/Competitive Intelligence.
- Develop the processes, tools, and methodologies to provide the organization with insights needed to support **strategic decision making, e.g., Patient Support Program analytics**.
- Support the evaluation of the potential profitability of market opportunities and marketing initiatives proposed by franchise/TA, promoting innovation in marketing, business analytics.
- Responsible for the **development of a market and business intelligence plan** for a franchise/TA.
- Lead as the primary point of contact for franchise/TA to identify/prioritize actions to be included in the business intelligence plan.
- Review and evaluate, from a business perspective, business drivers, contracts/agreements, business proposals/cases and provide brand leads/franchise heads with recommendations.
- Develop the design and operation of a reporting system(s): KPIs, dashboard, balanced scorecard, etc. to assess the performance of the brands and franchises using **python/PowerBI**.
- Lead franchise/TA interpretation and analysis of key business indicators to identify & communicate trends, and issues.
- Monitor reporting operations, improve pertinence & efficiency of data collection and reporting.
- Partner with commercial teams to establish accurate, real-time market and operational forecasts.
- Working with **finance, ensure budgeting & forecasting systems** and process to achieve timely & accurate reporting to management and corporate personnel.

**Market Access Analyst:** Sanofi

**Jan 2022-Dec 2022**

- Market access, strategy, pricing, and reimbursement analyst (e.g., **health economic/pricing analysis**, database, **IQVIA claims analysis, & forecasting**) in support of market access projects.
- Development of pricing & reimbursement strategy, submissions, reports, presentations, and other supplementary materials. Review and assessment of Health Technology assessment of current products and market competitors.
- Creating reports, computing analytics using **Excel/python/PowerBI and** preparing PowerPoint presentations for internal and external stakeholders in Market Access projects.
- Review policy documents and position papers to assist in the development of policy positions relating to the health care system and the biopharmaceutical industry in Canada.
- Collaboration with cross-functional team such as Marketing, Finance, Public Affairs, Business Operations, Medical Affairs, Regulatory, Launch Excellence, etc. to achieve reimbursement objectives and to support commercial objectives for successful launch of innovative medicines.
- Providing Digital Innovation strategy insights as it relates to data management (cloud platforms & databases), data analytics, and data visualization platforms such as Excel, python, and Power BI.

## RESEARCH EXPERIENCE:

**Senior Research Scientist:** Gradinaru Lab and Wells (Pharmacology) Lab UofT **2014-2021**

- Designed & performed high-end cross-functional collaborative research using fluorescence-based assays & laser imaging techniques to study complex biological systems.
- Extensive program management and leadership experience with cross-country/international joint research ventures, leading to 5 co-authored publications in 5 years.

**Research Opportunity Program, Supervisor:** (UofT) **2016-2021**

- Led, mentored designed & developed well-defined 3–6-month research projects for undergraduates.

## TEACHING EXPERIENCE:

**Assistant Teaching Professor** **2025-Present**

- BIOT5630-Cell Culture Applications
- BIOT5810-Cutting-Edge Applications in Molecular Biotechnology

**Assistant Professor, Teaching Stream** **2024-Present**

### **Courses Taught:**

- PHY147-Physics Principles II
- JCP322-Statistical Mechanics
- PHY451-Classical Electrodynamics
- PHY325-Mathematical&Computational Physics
- BTC1710- Biomaterials & Protein Chemistry Theory: New Trends in Drug Discovery & Biotechnology

### **Research & Experiential Learning Programs:**

- PHY399-Exploring Computational Techniques in Medical Imaging
- PHY399-ChatGPT for Drug Discovery? Developing Proteomic Large Language Models
- PHY399-Research & Development of Computational Modules for Educational Purposes
- CHM399-Optimizing Cell Growth for the Expression & Purification of G protein-Coupled Receptors
- PHY473-AI&ML Computational Techniques for Ultrasound Medical Imaging, Analysis & Diagnostics
- PHY473- Physics Principles of Cardiology & Novel AI/ML Computational Techniques in Diagnostics
- CPS489-Design, Development, & Implementation of Ultrasound Medical Imaging Systems & Devices
- PHY372-Exploring Computational Methods & Model Protein Systems for LLM Validation
- CSC392/492-Design, Development & Implementation of Large Language Models for Drug Discovery
- PHY473-Design and Development of a python-based Förster Resonance Energy Transfer Simulator
- CPS400-Chemical & Physical Sciences Industry on-site Placement Supervisor

**Sessional Course Instructor:** (UofT) **2020-2023**

- **Quantum Mechanics I: Foundations** JCP321H5 (U of T, Sept-Dec 2020)
- **Mathematical & Computational Physics** PHY325H5 (U of T: Sept-Dec 2021, Sept-Dec 2023)

**Teaching Assistant:** (UofT) **2014-2022**

- **Introductory to Physics:** PHY136/137H5S (2014-2017), **Introduction to Optics:** PHY347H5S (2018, 2021), **Vibrations & Waves:** PHY245H5F (2018, 2019), **Advanced Physics Labs:** PHY324H5F (2021), **Calculus for Life Sciences:** MAT134Y5/MAT132H5 (2018-2020). **Quantum Mechanics II:** JCP421 (2022)

## **SCIENTIFIC PUBLICATIONS:**

**Synthesis of Stable Multifunctional Perfluorocarbon Nanoemulsions for Cancer therapy & Imaging.** Fernandes, D.A.; **Fernandes, D.D.**; Li, Y.; Wang Y.; Zhang, Z.; Gradinaru, C.C.; Rousseau, D.; Kolios, M. (2016, American Chemical Society Langmuir).

**Single-molecule Analysis of the Supramolecular Organization of the M<sub>2</sub> Muscarinic Receptor and the G $\alpha_{i1}$  Protein.** Shivnarine, R.V.; **Fernandes, D.D.**; Ji, H.; Li, Y.; Kelly, B.; Zhang, Z.; Han, N.; Huang, F.; Sankar, K.S.; Dubins, D.N.; Rocheleau, J.V.; Wells, J.W.; Gradinaru., C.C. (2016, Journal of the American Chemistry Society).

**Characterization of Fluorescein Arsenical Hairpin (FIASH) as a Probe for Single-Molecule Fluorescence Spectroscopy.** **Fernandes, D.D.**; Bamrah. J.\*\*; Kailasam S.; Gomes, G-N.; Li, Y.; Wieden, H.; Gradinaru, C.C. (2017, Scientific Reports, Nature Publishing Group).

**Ligand Modulation of Conformational Dynamics of the A<sub>2A</sub> Adenosine Receptor Revealed by Single-Molecule Fluorescence.** **Fernandes, D.D.**; Neale, C.; Gomes, G-N. W.; **Malik, A.**\*\*; Li, Y., Pandey, A.; Oraziotti, A.; Wang, X.; Ye, L.; Prosser, S.; Gradinaru, C.C. (2021, Scientific Reports, Nature Publishing Group).

**Multifunctional Nanoparticles as Theranostic Agents for Therapy and Imaging in Breast Cancer Cells.** Fernandes, D.A.; **Fernandes, D.D.**; **Malik, A.**\*\*; Gomes, G-N. W.; Appak-Baskoy, Berndl, E.; S.; Gradinaru, C.C.; Kolios, M. (2021, Journal of Photochemistry & Photobiology).

Underline indicates either first author or co-first author.

\*\* Indicates students I have mentored.

## **REFERENCES:**

Dr. Claudiu C. Gradinaru, University of Toronto. PhD supervisor (claudiu.gradinaru@utoronto.ca)  
Dr. Wagih Ghobriel, University of Toronto, Physics Teaching Mentor (wagih.ghobriel@utoronto.ca)  
Dr. Lindsay Schoenbohm, University of Toronto, Department Chair (lindsay.schoenbohm@utoronto.ca)  
Dr. Scott Prosser, University of Toronto, Biotechnology Teaching Mentor (scott.prosser@utoronto.ca)