

Name: Arkadiy Lyakh  
Job Title: Associate Professor, UCF  
Professional Address: 4353 Scorpius Street, #317, Orlando, FL 32816  
Telephone number: 407-823-0699  
Email address: arkadiy.lyakh@ucf.edu

### (a) Professional Preparation

Undergraduate Institution	Moscow Institute of Physics and Technology	Applied Physics	B.S. 2001
Graduate Institution #1	Moscow Institute of Physics and Technology	Applied Physics	M.S. 2003
Graduate Institution #2	University of Florida	EE	Ph.D. 2007

### (b) Appointments

- Associate Professor, University of Central Florida; August 2020 to present
- Assistant Professor, University of Central Florida; September 2015 to August 2020
- Director: High Performance QCL Development, Pranalytica, Inc.; June 2011 to August 2015
- Senior Scientist, Pranalytica, Inc.; May 2007 to June 2011

### (c) Products

-Standing absolute record for QCL-on-Si performance (Enrique Cristobal, Matthew Fetters, Amy WK Liu, Joel M Fastenau, Ahmad Azim, Luke Milbocker, Arkadiy Lyakh, “High peak power quantum cascade lasers monolithically integrated onto silicon with high yield and good near-term reliability”, Applied Physics Letters 122, 141108 (2023))

-The development of first high power dual-band QCLs, unique capability needed for several critical DoD applications (Luke Milbocker, Hong Shu, Jack Erspamer, Arkadiy Lyakh, “High peak power, high temperature dual-band quantum cascade lasers”, DoD Journal of Research and Engineering 6, issue 1 (2023))

-Standing absolute record in QCL power (M. Suttinger, R. Go, A. Azim, E. Sanchez, H. Shu, and A. Lyakh, “High Brightness, Broad-Area Buried Heterostructure Quantum Cascade Lasers,” Journal of DoD Engineering; Volume 4, Issue 2 (2020))

-The development of first QCLs grown on a lattice-mismatched substrate (R. Go, H. Krysiak, M. Fetters, P. Figueiredo, M. Suttinger, J. Leshin, X. Fang, J. Fastenau, D. Lubishev, A. Liu, A. Eisenbach, M. Furlong, and A. Lyakh, “Room temperature operation of quantum cascade lasers monolithically integrated onto a lattice-mismatched substrate,” Applied Physics Letters 112, (2018))

-The development of QCLs with >28% efficiency, which has been the absolute record for five years until recently (A. Lyakh, M. Suttinger, R. Go, P. Figueiredo, and A. Todi, “5.6 $\mu$ m quantum cascade lasers based on a two-material active region composition with a room temperature wall-plug efficiency exceeding 28%”, Applied Physics Letters 109, 121109 (2016))

-Leading technical role in the development of first multiwatt continuous wave room temperature QCLs in MWIR and LWIR spectral regions. A number of early world records in QCL power and efficiency at specific, commercially important wavelengths (A. Lyakh, R. Maulini, A. Tsekoun, R. Go, and C. K. N. Patel, “Tapered 4.7 $\mu$ m quantum cascade lasers with highly strained active region composition delivering over 4.5 watts of continuous wave optical power”, Optics Express 20, 4382, February 2012; A. Lyakh, R. Maulini, A. Tsekoun, R. Go, and C. K. N. Patel, “Multiwatt long wavelength quantum cascade lasers based on high strain composition with 70% injection efficiency”, Optics Express 22, 24272, October 2012; A. Lyakh, R. Maulini, A. Tsekoun, R. Go, S. Von Der Porten, C. Pflugl, L. Diehl, F. Capasso, and C. K. N. Patel, “High-performance continuous-wave room temperature 4.0- $\mu$ m quantum cascade lasers with single-facet optical emission exceeding 2 W”, Proceedings of the National Academy of Sciences, vol. 107, p. 18799, November 2010)

**(d) Graduate teaching experience**

- OSE 6938 – developed new graduate level course on quantum cascade lasers, spring 2017
- IDS 6938 – developed new graduate class on quantum wells, dots, and wires at NSTC, UCF, spring 2016
- EE270 - graduate class on applied quantum mechanics at UCLA, fall 2014

**(e) Graduate students mentored (to completion, if applicable)**

- Enrique Cristobal (Lyakh - chair) – received PhD degree from CREOL, UCF in 2021
- Mathew Suttinger (Lyakh chair) - received PhD degree from CREOL, UCF in 2020
- Rowel Go (Lyakh - chair) – received PhD degree from EE, UCF in 2020
- Pedro Figueiredo (Lyakh - chair) – received PhD degree from Physics in 2017
- In addition to the four students above, seven students received M.S. degrees under Lyakh’s supervision

**(f) Other synergistic activities related to Graduate Education**

- Lyakh has been awarded sixteen USPTO patents for his inventions in the QCL field
- Lyakh started IRGLARE, LLC, a small business specializing in commercialization of high performance QCLs
- The UCF QCL patent portfolio has been licensed by IRGLARE; the lasers are supplied to various DoD-oriented customers and address various critical defense needs