Anna I. Ponomarenko

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Overview

Highly interdisciplinary, results-driven and detail-oriented scientist with extensive experience in virology, gene therapy, cell and molecular biology. Team-oriented and organized, capable of managing multiple projects and establishing cross-functional collaborations to solve complex research problems. Excellent written and oral communication skills, as exemplified by multiple publications, internal presentations and participation in research conferences.

Experience

Scientist II 09/2022 – Present

Ultragenyx Pharmaceutical, Cambridge MA

- Advanced the Pinnacle rAAV production platform as a part of cross-functional team
- Applied ddPCR, Southern blotting and ONT sequencing to characterize rAAV quality
- Managed and supported a Senior Research Associate I

Scientist I 09/2020 – 08/2022

Ultragenyx Pharmaceutical, Cambridge MA

- Executed rAAV and rAd5 studies that drive company's research and development goals
- Collaborated internaly across Gene Therapy and Pharmaceutical Development teams and externally with CROs
- Developed an alternative potency assay for one of Ultragenyx gene therapy programs
- Applied CRISPR mediated gene up/down regulation for advancing existing cell-based assays

Research Specialist 09/2020

Massachusetts Institute of Technology, Cambridge MA

- Investigated influenza nucleoprotein host cell interactome to elucidate individual factors required for stabilization of biophysically defective but innate immune escape Pro283 variant

Graduate Research Assistant 06/2016 – 08/2020

Massachusetts Institute of Technology, Cambridge MA

- Discovered the critical role of host chaperones in potentiating influenza immune escape
- Developed cell-based assays in BSL-2+ environment to elucidate the molecular mechanisms of mutant viral proteins dependence on the host protein folding network
- Established external collaborations for biophysical investigation of influenza nucleoprotein
- Communicated research at international conferences (EMBO 2019, FASEB 2018, ACS 2018)

Summer Intern 07/2019 – 08/2019

Vertex Pharmaceuticals, Boston MA

- Developed human cell-based disease models and characterized using fluorescent microscopy
- Maintained primary human cells
- Synthesized, modified and purified RNA *in vitro*

Research Assistant 07/2011 – 05/2015

Institute of Bioorganic Chemistry of the Russian Academy of Sciences, Moscow, Russia

- Headed two distinct research projects focused on nanoscale materials and utilizing click chemistry: 1) Developed branched DNA oligonucleotide nanostructures and 2) Functionalized surface of semiconductor nanomaterials with biomolecules
- Established an external collaboration for AFM characterization of nanostructure assemblies
- Presented research at international conferences (NANO 2014, FNANO 2015)

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Research Assistant 09/2010 – 12/2013
Moscow State University, Moscow, Russia
- Synthesized, characterized and modified surface ligands of semiconductor nanocrystals

Education

- **PhD in Chemistry** 2020
  Massachusetts Institute of Technology, Cambridge MA
  Thesis: **The host heat shock response, viral immune escape and viral replication**
- **Specialist in Chemistry** (Russian MSc equivalent), *Diploma with Honors* 2014
  Moscow State University, Moscow, Russia, 2014
  Thesis: Functionalization of CdTe quantum dots with biomolecules

Selected Technical Skills

Virology: virus (rAAV, adenovirus, lentivirus, influenza A) generation/propagation/titer, rAAV and Ad5 purification, infectivity assays, CsCl gradient virus purification
Tissue culture: mammalian cell culture (adherent and suspension), primary human cells (fibroblasts, NHBE), transient transfection, lentiviral transduction, cell-based assays, confocal microscopy
Molecular Biology: cloning, nucleic acid isolation from bacteria, mammalian cells and viruses, RT-qPCR, ddPCR, Southern blotting, ONT sequencing
Biochemistry: SDS-PAGE, Western blotting, immunoprecipitation, CETSA, pulse-chase, ELISA
Data analysis: NGS data analysis using Python and Bash script (beginner), IGV, GraphPad Prism

Teaching and Leadership

Mentorship and Outreach 06/2016 – 09/2018
Massachusetts Institute of Technology, Cambridge MA
- Mentored high school, undergraduate and graduate students
- Developed and assisted short-term research projects for visiting students
- Volunteered for outreach events for local middle school students

Teaching Assistant 09/2015 – 05/2016
Massachusetts Institute of Technology, Cambridge MA
- Assisted teaching a laboratory course for 40+ non-chemistry major students
- Directed experiments, organized lectures and discussions, held help sessions, graded reports

Selected Publications

- Nekongo, E.E.*; **Ponomarenko, A.I.***; Dewal, M.B.; Butty, V.L.; Browne, E.P.; Shoulders, M.D. HSF1 Activation Can Restrict HIV Replication. **ACS Infect. Dis.**, 6, 1659-66 (2020).
  ***These authors contributed equally.**
- Phillips, A.M.*; **Ponomarenko, A.I.***; Chen, K.; Ashenberg, O.; Miao, J.; McHugh, S.M.; Butty, V.L.; Whittaker, C.A.; Moore, C.L.; Bloom, J.D.; Lin, Y.-S.; Shoulders, M.D. Destabilized Adaptive Influenza Variants Critical For Innate Immune Escape Are Potentiated By Host Chaperones. **PLoS Biol.**, 16, e3000008 (2018).
  ***These authors contributed equally, the listed order was determined by a random coin flip.**
- Phillips, A.M.; Gonzalez, L.O.; Nekongo, E.E.; **Ponomarenko, A.I.**; McHugh, S.M.; Butty, V.L.; Levine, S.L.; Lin, Y.-S.; Mirny, L.A.; Shoulders, M.D. Host Proteostasis Modulates Influenza Evolution. **eLife**, 6, e28652 (2017).

Selected Presentations

- Selected among MIT and Harvard graduate students to present a lecture for the general public at the Science in the News seminar series at Harvard University in October 2019
- Presented research at international and domestic research conferences as well as at MIT meetings
- Selected among 10 graduate students out of 68 for a «flash» talk at the FASEB Virus Structure and Assembly Science Research Conference in July 2018