ALEJANDRO M. SCAFFA C.V.

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Education

Ph.D. in Molecular Pharmacology and Physiology (MPP) ***(expected) May 2019***
Adviser: Dr. William Fairbrother
Brown University – Providence, Rhode Island Classes GPA: 4.00

Bachelor of Arts in Biochemistry with Honors ***May 2014***
Grinnell College – Grinnell, Iowa GPA: 3.53

Medical Biotechnology and Drug Development Semester Abroad ***Aug – Dec 2012***
Danish Institute for Study Abroad (DIS) – Copenhagen, Denmark GPA: 3.74

Interests:

My interests are in bioinformatics, high throughput genomics, large impact and creative research, genome editing, scientific communication, and teamwork. I am hoping to join the open graduate program at Brown University where I can graduate with a PhD in Molecular Pharmacology and Physiology as well as a M.S. in Computer Science.

Research Experience

Graduate Researcher, Brown University, Providence, RI ***Sept 2014 – Present***

Current PhD Project: "Engineering splicing mutations in HEK 293 cells using CRISPR/Cas9 system" – P.I.: Dr. William Fairbrother

- CRISPR Cas9 is known as the bacterial immune system. Cas9 creates breaks in DNA in a sequence of choice; this can be repaired through homology directed repair by supplying a strand of DNA, in our case with a desired mutation obtained via high throughput computational and biological assays. We will study mutations we believe have strong splicing effects.

Project 3: "Optimizing expression, purification, and refolding of the MqsR toxin from *Yersinia pestis* and *Pseudomonas fluorescens* in *E. Coli*" - P.I.: Dr. Rebecca Page.

- MqsR is an mRNA interferase toxin that when overexpressed and not bound to the antitoxin MqsA will stop arrest cell growth. We aim to refold this protein acquired from inclusion bodies in E.Coli (in absence of MqsA) in order to obtain large amounts of folded protein for structural analysis.

Project 2: "Elucidating the structure of mutant Protein Tyrosine Phosphatase 1B (PTP1B) using X-Ray Crystallography and NMR" - P.I.: Dr. Wolfgang Peti.

- PTP1B is a negative regulator of the insulin pathway and a drug target. We elucidated the structure of the Y152A/Y153A PTP1B using X-Ray Crystallography after optimizing process to obtain crystals.

Project 1: "Determining the structure of the N-terminal domain (NTD) of TAR DNA-binding protein 43 (TDP-43) and the effect of phosphorylation on its assembly" - P.I.: Dr. Nicolas Lux Fawzi.

- TDP-43 is found to form cytoplasmic inclusions in the motor neurons of patients with Amyotrophic Lateral Sclerosis (ALS). Its NTD is found to easily aggregate in vitro. We are studying how phosphorylation and specific mutations affect the NTD monomeric/oligomeric equilibrium in order to stabilize the monomeric form and solve its structure via NMR.

Undergraduate Researcher, Grinnell College, Grinnell, IA ***Jan 2012 – May 2014***

Title: "Characterization of Neuronal and Torpedo Nicotinic Acetylcholine Receptor (nAChR) via Liquid Chromatography Mass Spectrometry (LC-MS)" - P.I.: Dr. Mark Levandoski, and Dr. Elaine Marzluff.

- Improved purification methods for *Torpedo* nAChRs for better LC-MS sample preparation and eventual characterization of nAChR and other model proteins. In conjunction, voltage clamp techniques were used to

study nAChR in *Xenopus* oocytes. Research done throughout academic year and during one summer in a full-time capacity.

Teaching Experience, Grinnell College, Grinnell, IA

Brazilian Portuguese Curriculum Developer ***Jan 2013 – May 2014***

- Developed a teaching guide and a syllabus for Portuguese courses and online tests.

Biochemistry (BCM 262) Teaching Assistant ***Aug – Dec 2013***

- Held fruitful mentor sessions and provided support to Dr. Elizabeth Trimmer during all class sessions.

General Chemistry (CHM 129) Laboratory Assistant ***Jan – May 2013***

- Helped Dr. Trimmer by enforcing laboratory safety, explaining procedures, and grading students.

Brazilian Portuguese I and II Instructor ***Aug 2011 – Jun 2012***

- Created syllabus and developed dynamic presentations about Portuguese language and culture.

Leadership Experience

Department Representative for MPP, Brown University, Providence, RI ***Oct 2015 – Present***

- Responsible for communicating the interest MPP Ph.D. students to the Graduate Student Council as well as vote in pertinent matters.

Class Representative of Psychopharmacology, DIS, Copenhagen, Denmark ***Aug – Dec 2012***

- Communicated and coordinated class opinion and relationship with our professors in an effort to better multi-cultural classroom learning.

Team Leader for International Pre-Orientation Program, Grinnell College, Grinnell, IA ***Aug – Oct 2011***

- Planned and Lead activities focused on the adaptation of 72 students from different countries as they transitioned to life at Grinnell College and in the U.S.A.

Academic Honors

Pharmacology Pre-Doctoral Fellow, Brown University, Providence, RI ***2015***

Bachelor of Arts with Honors ***2014***

Dean's List ***2012***

Intel® International Science and Engineering Fair (ISEF) co-hosted by Google, San Jose, CA ***2010***

- 1st Prize in Biochemistry, Best in Category Award (Biochemistry), Naming rights of a minor planet

Abstracts and Presentations

Genome Engineering: The CRISPR/Cas Revolution, Cold Spring Harbor Laboratories, and NY **Sept 2015**

- Abstract and poster title: "Engineering splicing mutations in HEK 293 cells using CRISPR/Cas9 system"

First Year Talk, Brown University, Providence, RI **May 2015**

- Seminar Title: " Elucidating the structure of Protein Tyrosine Phosphatase 1B YAYA"

Midstates Conference for Math and Science, University of Chicago, Chicago, IL **Oct 2013**

- Seminar Title: "Elucidating the allosteric binding site of nicotinic acetylcholine receptors via liquid chromatography mass spectrometry"

Skills

Programming: **Working knowledge of Python, Julia, Unix, R, and Matlab.**

Computer skills: Proficient in Microsoft Office and good knowledge of scientific software such as TopSpin, ChemDraw, and Swiss-PdbViewer.

Laboratory: Experience with NMR, X-Ray Crystallography, LC-MS, protein purification, DNA manipulation, E. Coli expression, voltage-clamp, frog surgery, and scientific writing.

Languages: Native or bilingual proficiency: Spanish, English and Portuguese. Elementary proficiency: Danish and Bulgarian.