Title of Project: HECT E3 Ubiquitin Ligases: Identifying the biochemical and molecular basis of human diseases

Main Contact: Donald E. Spratt, Ph.D., Carl J. and Anna Carlson Endowed Research Chair, Assistant Professor of Chemistry & Biochemistry, Adjunct Assistant Professor of Biology, Carlson School of Chemistry & Biochemistry
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Deadline: April 3rd, 2017

Duration: 35 hours/week for 8 weeks
Start Date: Monday, June 5th, 2017

Location: Carlson School of Chemistry & Biochemistry

Position Description:
Four Summer Student LEEP projects are available in the laboratory of Dr. Donald Spratt in the Carlson School of Chemistry & Biochemistry at Clark University. The methods and techniques that the successful LEEP applicants will master in the Spratt Lab are in high-demand in the biotechnology and medical industries. The skills that the student will acquire working with Dr. Spratt will give them a competitive edge when applying for graduate and medical schools or when they enter the workforce.

The research program in the Spratt Lab is focused on deciphering the unique mechanisms employed by members of the HECT (Homologous to E6AP Carboxyl Terminus) E3 ubiquitin ligase family. Combined approaches in molecular biology, biophysics and 2D/3D NMR spectroscopy are employed to examine the structure and function of these important enzymes. The laboratory is fully equipped for routine molecular biology, biochemistry, biophysics and NMR spectroscopic analyses of proteins.

Working at the interface of physical biochemistry and chemical biology, the Spratt Lab research team aims to better understand how HECT E3 ubiquitin ligases attach ubiquitin or ubiquitin-like proteins to a substrate protein. A better understanding of these processes is the first step towards the development of novel therapeutic interventions and potent drug design to treat diseases related to HECT E3 ligase dysfunction. Specifically, the Spratt Lab is focused on the following themes:

1. Molecular basis for specificity in ubiquitin chain linkage by the HECT E3 ligases
2. Mechanism and ubiquitin handling by the HECT E3 ligases
3. Substrate recognition by the HECT E3 ligases

These studies will help to clarify how HECT E3 ligases form multi-protein complexes to build ubiquitin chains. Understanding the malfunction of these complexes is central to understanding numerous human diseases including various cancers, autism, Angelman syndrome, and viral infections (HPV and HIV).
Qualifications:
Desired Major: Biochemistry & Molecular Biology, Chemistry or Biology

Desired (but not absolutely required) previous course work: BCMB 271 – Biochemistry I, BCMB 272 – Biochemistry II, BIOL 137 – Cell Biology, BCMB 131 – Recombinant DNA, CHEM 131 – Organic Chemistry I.

Required Skills:
1. The ability to work independently and with others in a team-oriented environment
2. The ability to work in a fun, fast-paced research setting
3. Have an inquisitive mind and be interested in understanding and learning about the biochemical and molecular basis of human diseases
4. Strong quantitative skills
5. Take excellent lab notes
6. Be punctual and have excellent time management skills

Desired Skills:
7. Quick learner of techniques used to express, purify, quantify, and characterize biological molecules
8. Competency with Microsoft Office.

Housing: Housing will not be provided. Students are responsible for finding their own housing.

For more info: Additional information on the Spratt Lab research team, projects, and lab equipment routinely used for the expression, purification, and characterization of proteins/enzymes can be found at http://wordpress.clarku.edu/dspratt

Funding: $2500 Available through the LEEP Fellows Program.

How to Apply:
Interested applicants are encouraged to send their resume, cover letter and contact information for 2 references to Dr. Spratt at dspratt@clarku.edu.

To apply for LEEP Funding and to be considered as a LEEP fellow, students must secure the position and complete the LEEP Fellows Application Process March 3rd (for early decision) or April 14th. Students will be required to submit a resume, cover letter, and a proposal outlining how they will complete their project.

Additional position information is available through Clark Recruiter. (Recommendation letters should be emailed directly to rmaddox@clarku.edu)

About the Organization:
Clark's academic community has long been distinguished by the pursuit of scientific inquiry and humanistic studies, enlivened by a concern for significant social issues. Among many other scholarly endeavors, Clark contributes to understanding human development, assessing relationships between people and the environment, and managing risk in a technological society.