Curriculum Vitae

Alexander R. Leydon
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EDUCATION:

Ph.D April 2015 – Brown University. Graduate Program in Molecular Biology, Cellular Biology and Biochemistry. Advisor: Dr. Mark Johnson.
ScB. May 2007 – Brown University. Concentration: Human Biology. *Honors*. Advisor: Dr. Alison DeLong.

PROFESSIONAL APPOINTMENTS:

February 2017 – current Post-doctoral Researcher. University of Washington Department of Biology, Laboratory of Dr. Jennifer Nemhauser.
May 2015 – January 2017 Post-doctoral Researcher. Brown University Department of Molecular Biology, Cellular Biology and Biochemistry, Laboratory of Dr. Mark Johnson.

PUBLICATIONS:

- **Leydon AR**, Gala HP, Guizou S, Nemhauser JL. Engineering Synthetic Signaling in Plants. **Annual Reviews in Plant Biology**. 2020.
- Hamm MO, Moss BL, **Leydon AR**, Gala HP, Lanctot A, Ramos R, Klaeser H, Lemmex AC, Zahler ML, Nemhauser JL, Wright RC. Accelerating structure-function mapping using the ViVa webtool to mine natural variation. **Plant Direct**. 2019.
- Khakhar A, **Leydon AR**, Lemmex AC, Klavins E, Nemhauser JL. Synthetic hormone-responsive transcription factors can monitor and re-program plant development. **eLife**. 2018.
- **Leydon AR**, Weinreb C, Venable E, Reinders A, Ward JM, Johnson MA. The Molecular Dialog between Flowering Plant Reproductive Partners Defined by SNP-Informed RNA-Sequencing. **Plant Cell. 2017.**
- Padmanaban S, Czerny DD, Levin KA, **Leydon AR**, Su RT, Maugel TK, Zou Y, Chanroj S, Cheung AY, Johnson MA, Sze H. Transporters involved in pH and K+ homeostasis affect pollen wall formation, male fertility, and embryo development. **Journal of Experimental Botany. 2017.**
- **Leydon AR**, Tsukamoto T, Johnson MA, Palanivelu R. Pollen tube discharge completes the process of synergid degeneration that is initiated by pollen tube - synergid interaction in Arabidopsis. ***Plant Physiology*. 2015**.
- **Leydon AR**, Chaibang A, Johnson MA. Interactions between pollen tube and pistil control pollen tube identity and sperm release in the Arabidopsis female gametophyte.

***Biochemical Society Transactions*. 2014**.

- Soruco MM, Chery J, Bishop EP, Siggers T, Tolstorukov MY, **Leydon AR**, Sugden AU, Goebel K, Feng J, Xia P, Vedenko A, Bulyk ML, Park PJ, Larschan E. The CLAMP protein links the MSL complex to the X chromosome during Drosophila dosage compensation. ***Genes and Development*. 2013**.
- **Leydon, AR**, Beale, KM, Woroniecka, K, Castner, E, Chen, J, Horgan, C, Palanivelu, RS, Johnson, MA. Three MYB transcription factors control pollen tube differentiation required for sperm release. ***Current Biology*. 2013**.
- Beale, KM, **Leydon, AR**, Johnson, MA. A block to polytubey is triggered by gamete fusion in Arabidopsis thaliana*. Current Biology.* 2012.
- Wong JL, **Leydon AR**, Johnson MA. HAP2(GCS1)-dependent gamete fusion requires a positively charged carboxy-terminal domain. ***PLoS Genetics*. 2010**.
- Qin Y, **Leydon AR**, Manziello A, Pandey R, Mount D, Denic S, Vasic B, Johnson MA, Palanivelu R. Penetration of the stigma and style elicits a novel transcriptome in pollen tubes, pointing to genes critical for growth in a pistil. ***PLoS Genetics*. 2009.**

PUBLICATIONS (In preparation):

- **Leydon AR**, Wang E, Gala, HP, Gilmour S, Juarez-Solis S, Zahler ML, Zemke JE, Zheng N, Nemhauser LN. Structure-function analysis of *Arabidopsis* TOPLESS reveals fundamental conservation of repression mechanisms across eukaryotes. In Review, 2020.

RESEARCH EXPERIENCE:

2017-Present University of Washington, Department of Biology. Laboratory of Jennifer L. Nemhauser - Postdoctoral researcher:

- Identifying mechanisms of GRO/TLE gene family transcriptional corepression utilizing a synthetic auxin response circuit in *Saccharomyces cerevisiae*.
- Developing tools to tune endogenous hormone response pathways using Cas9-based transcription factors using *Arabidopsis* as a platform for translation into agriculturally relevant plant species.
- Analysis of long-term transcriptional repression in auxin signaling pathways using direct genome editing through CAS9 endonucleases in *Arabidopsis*.

2015-2017 Brown University, Department of Molecular Biology, Cellular Biology and Biochemistry. Laboratory of Mark A. Johnson - Postdoctoral researcher:

- Transcriptional profiling of MYB transcription factor-mutant pollen by RNA-Seq and bioinformatics analysis of differential expression. RNASeq-SNP identification and mRNA cell-type origin using inter-ecotype crosses.

2010-2015 Brown University PhD – Doctoral Dissertation

Three MYB transcription factors coordinate expression of an array of secreted proteins that promote pollen tube identity and reproductive cell signaling.

- Live-cell imaging using confocal and fluorescence microscopy to visualize MYB transcription factor mutant pollen tube reception defects within the ovule.
- Transcriptional profiling of MYB transcription factor-mutant pollen by microarray and bioinformatics analysis of differential expression.
- Heterologous expression & purification of MYB-regulated small proteins in *E. coli* & the methylotrophic yeast *P. pastoris* to test protein activity against cultured ovules in vitro.

2007-2010 Brown University Pollen Genetics Lab - Research Assistant: Identification and characterization of genes required for pollen development and function. Advisor: Mark Johnson

- T-DNA mutant screening (~200) for pollen grain developmental defects using distorted segregation, and microscopy.
- Identified five genes with altered growth phenotypes during in vitro pollen tube growth and two genes required for pollen tube growth and guidance in vivo.

2006-2007 Brown University, Undergraduate Independent Research: Protein Phosphorylation controls reproductive development in an isoform specific manner. Advisor: Alison DeLong

- Discovered roles for PP2A A-regulatory isoforms in gametophyte and early embryo development.

FELLOWSHIPS:

- Simons Foundation Fellow of the Life Sciences Research Foundation. Effective August 1st , 2018-2021.

AWARDS:

- Linksens Medal for Best Presentation; 24th International Association for Sexual Plant Reproduction Research Conference. Tucson, Arizona. 2016.
- Barry Jay Rosen Memorial Award, Graduate Program in Molecular Biology, Cell Biology and Biochemistry, Brown University. 2015.
- Best Oral Communication: Regulation of Fertilization and Early Seed Development, University of Bath, UK. 2013.
- Best Poster Presentation: Northeast Regional Meeting of the Society for Developmental Biology. Woods Hole, MA. 2011.
- Best Graduate Student Poster Award: Molecular Biology, Cellular Biology, and Biochemistry Annual Retreat. 2011.

INVITED TALKS:

- Northwest Developmental Biology Meeting, Friday Harbor, WA. “A synthetic approach to understanding establishment and relief of transcriptional repression”. 2019.
- GARNet workshop on gene editing, School of Chemistry, University of Bristol, UK. “The GA biosynthesis pathway can be re-programmed in a model driven manner using hormone activated Cas9-based repressors (HACRs)”. 2018.
- 24th International Congress on Sexual Plant Reproduction, Tucson, Arizona, “SNP-informed RNA-Sequencing identifies small secreted proteins controlling pollen tube-pistil interactions”. 2016.
- Plants in New England, Whitehead Institute, MA. “Decoding Reproductive Dialog: Small secreted proteins control pollen tube-synergid interactions”. 2014.
- 23rd International Congress on Sexual Plant Reproduction, Porto, Portugal. “Untangling pollen tube and pistil gene expression using SNP-informed deep sequencing”. 2014.
- Biochemical Society, Regulation of Fertilization and Early Seed Development, University of Bath, UK. “Three MYB transcription factors control interactions with synergid cells required for reception and sperm release in Arabidopsis”. 2013.
- Brown University Department of Molecular Biology, Cell Biology, and Biochemistry Annual Retreat. “Penetration of the stigma and style elicits a novel transcriptome in pollen tubes, indicating potentiating transcriptional networks”. 2011.
- Pollen Research Coordination Network Meeting, Minneapolis, MI. “Identifying transcriptional regulators essential for pollen tube growth and guidance”. 2011.

POSTER PRESENTATIONS:

- Plant Synthetic Biology, San Jose, CA. “Uncovering the mechanism of TOPLESS co-repression identifies modular repression domains”. 2019.
- American Society for Plant Biology, Providence, RI. “A pollen tube transcriptional network controls interactions with synergid cells required for reception and sperm release in Arabidopsis”. 2013.
- XXII International Congress on Sexual Plant Reproduction Meeting. Melbourne, Australia. “A family of pollen tube-expressed transcription factors is essential for pollen tube reception”. 2012.
- American Society for Plant Biology, Minneapolis, MI. “A pair of pollen-specific beta-galactosidases is essential for pollen tube growth”. 2011.
- Northeast Regional Meeting of the Society for Developmental Biology, Woods Hole, MA. “Identifying transcriptional regulators essential for capacitating pollen tube growth and guidance”. 2011.
- Frontiers in Sexual Plant Reproduction III, Tucson, Arizona. “*hapless* mutations affecting sperm development and the paternal contribution to embryogenesis”. 2008.

TEACHING EXPERIENCE:

- Guest Lecturer. BIOL416 - Molecular Genetics of Plant Development. 2019.

- Lab Mentor for Undergraduate independent research students Samuel Juarez-Solis, Joseph Zemke, and Deepthi Sathyanarayana. University of Washington, Biology Department. 2019.
- Lab Mentor for STEMPREP summer research student Utkal Pandey, University of Washington, Biology Department. 2017.
- Lab Mentor for Undergraduate independent research students Molly Zahler, and Oghenemega Okoloko University of Washington, Biology Department. 2017.
- Cold Spring Harbor Course “Frontiers and Techniques in Plant Science”. Teaching Assistant. Responsible for planning and running laboratory sessions. 2013.
- Howard Hughes Medical Institute Undergraduate Summer Course “Genome Explorers”. Teaching Assistant. Responsible for leading and planning laboratory sessions. 8-week course. 2012.
- Brown University Course Plant Organism (BIOL 0440). Teaching Assistant. Responsible for leading and planning laboratory sections. 2012.
- International Pollen Genetics Course. Teaching Assistant. Responsible for leading and planning laboratory sessions. 2-week intensive laboratory course for graduate students, postdocs, and young professors. 2011.
- University of Rhode Island Department of Chemistry Laboratory for Chemistry 101 (General Chemistry Lecture) CHM 102. Instructor (Part-Time Faculty). Providence, RI. 2007 – 2008.
- Brown University, Department of Molecular Biology, Cell Biology, and Biochemistry. Undergraduate Senior Honor Biology Thesis Mentor: 2010-2015 (Eight students).