

Robert C. Orchard II

UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER

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EDUCATION

- 2008-2013 **U. T. Southwestern Medical Center, Dallas, TX**
Graduate Student, Molecular Microbiology Program Advisor: Dr. Neal Alto
The molecular mechanisms of host/pathogen interactions
- 2005-2008 **Texas A&M University, College Station, TX**
Bachelor of Science in Microbiology, Summa Cum Laude, Graduated in 3 years

RESEARCH POSITIONS

- 2018-Present **U.T. Southwestern Medical Center, Dallas, TX**
Assistant Professor, Department of Immunology
- 2013- 2018 **Washington University in St. Louis School of Medicine St. Louis, MO**
Postdoctoral Research Fellow, Department of Pathology and Immunology Advisor: Dr. Skip Virgin
CRISPR/Cas9 screening for essential host factors for viral replication
- 2008-2013 **U. T. Southwestern Medical Center, Dallas, TX**
Graduate Student, Molecular Microbiology Program Advisor: Dr. Neal Alto
The molecular mechanisms of host/pathogen interactions
- 2006-2008 **Texas A&M University, College Station, TX**
Undergraduate Research Scholar, Department of Biochemistry and Biophysics Advisor: Dr. Ryland Young
Genomic analysis of *Burkholderia* and *Rhodococcus equi* bacteriophages
- 2006 **University of Greifswald, Greifswald, Germany**
DAAD RISE Scholar, Botanical Institute and Botanical Garden Advisor: Dr. Jens Tesmer
Characterize *Protostelid* species diversity

FUNDING

- 2017-2021 K99/R00 Pathway to Independence Award, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health
- 2013 Immunology Postdoctoral Fellow, NIH Program Training Grant, Washington University
- 2009 Molecular Microbiology Fellow, NIH Program Training Grant, UT Southwestern

STUDENT TRAINING

- 2015-2018 Research advisor for Ying-Chiang "Jeffrey" Lee
- 2009-2011 Core Course Tutor for the Division of Basic Science at UT Southwestern
- 2007-2008 Supplemental Instruction Leader for Organic Chemistry at Texas A&M University

AWARDS

- 2013 Harold M. Weintraub Graduate Student Award, Fred Hutchinson Cancer Research Center
- 2012 Finalist for the Nominata Graduate Student Award, UT Southwestern
- 2012 Best in Show Poster, Graduate Student Organization Poster Competition, UT Southwestern
- 2011 The 61st Meeting of Nobel Laureates in Lindau

2008 Most Outstanding Thesis Undergraduate Research Scholars Program, Texas A&M University
2007 C.O. Patterson Microbiology Scholar, Texas A&M University

INVITED TALKS

2016 Gene Editing Workshop, Monsanto, St. Louis, MO
2013 Harold M. Weintraub Graduate Student Award Symposium, Fred Hutchinson Cancer Research Center, Seattle, WA

SCIENTIFIC MEETINGS

2017 **Gordon Research Conference on Virus and Cells, Barga, Lucca, Italy**
Poster Title: "CD300lf and Ceramide Synthesis Are Required for Murine Norovirus Entry"
2017 **Gordon Research Seminar on Virus and Cells, Barga, Lucca, Italy**
Talk Title: "CD300lf and Ceramide Synthesis Are Required for Murine Norovirus Entry"
2016 **12th Annual Postdoc Scientific Symposium, Washington University, St. Louis, MO**
1 of 5 Postdoctoral fellows from Washington University chosen to present their research
Talk Title: "A Proteinaceous Receptor for a Norovirus"
2016 **Keystone Symposia Cell Biology and Immunology of Persistent Infections, Banff, Alberta, CA**
Talk Title: "Genome-wide CRISPR Screen Identifies CD300lf as a Receptor for Murine Norovirus"
2012 **Gordon Research Conference on Microbial Toxins and Pathogenicity, Waterville Valley, NH**
Poster Presentation: "Identification of F-actin as the dynamic hub in a microbial-induced GTPase polarity circuit"
2011 **American Society for Microbiology General Meeting, New Orleans, LA**
Poster Presentation: "A Positive Feedback Loop Localizes Filopodia Dynamics During Pathogenic *E. coli* Infection"
2011 **FASEB Function of Small GTPase Summer Conference**
Poster Presentation: "The Identification of F-actin as the Dynamic Hub in a Microbial Induced GTPase Polarity Circuit"
2011 **The 61st Meeting of Nobel Laureates in Lindau**
1 of 80 students invited from the United States to attend an international meeting designed to connect successful young scientists with Nobel laureates in Lindau, Germany

PUBLICATIONS

1. Huang Z, Sutton SE, Wallenfang AJ, **Orchard RC**, Wu X, Feng Y, Chai J, and Alto NM. Structural insights into host GTPase isoform selection by a family of bacterial GEF mimics. *Nature Structural and Molecular Biology*. 2009. 16(8): 853-60.
2. Selyunin A, Sutton SE, Weigele BA, Reddick LE, **Orchard RC**, Bresson S, Tomchick D, and Alto NM. The assembly of a GTPase-kinase signaling complex by a bacterial catalytic scaffold. *Nature*. 2011. 469(7328): 107-11.
3. Summer EJ, Liu M, Gill JJ, Grant M, Bertoli M, Chan-Cortes TN, Ferguson L, Janes C, Lange K, Moore C, **Orchard RC**, Cohen N, and Young R. Genomic and functional analysis of Rhodococcus equi phages ReqiPepy6, ReqiPoco6, ReqiPine5 and ReqiDocB7. *Applied and Environmental Microbiology*. 2011. 77(2):669-83.
4. **Orchard RC** and Alto NM. Mimicking GEFs: A Common Theme for Bacterial Pathogens. *Cellular Microbiology*. 2012. 14(1): 10-8.
5. **Orchard RC**, Kittisopikul M, Altschuler SJ, Wu LF, Suel GM, Alto NM. Identification of F-actin as the dynamic hub in a microbial-induced GTPase polarity circuit. *Cell*. 2012. 148(4):803-15.

6. Martinez J, Malireddi RK, Lu Q, Cunha LD, Pelletier S, Gingras S, **Orchard R**, Guan JL, Tan H, Peng J, Kanneganti TD, Virgin HW, Green DR. Molecular characterization of LC3-associated phagocytosis reveals distinct roles for Rubicon, NOX2, and autophagy proteins. *Nature Cell Biology*. 2015. (7):893-906.
7. Selleck EM, **Orchard RC**, Lassen KG, Beatty WL, Xavier RJ, Levine B, Virgin HW, Sibley LD. A noncanonical autophagy pathway restricts *Toxoplasma gondii* growth in a strain-specific manner in IFN- γ activated human cells. *MBio*. 2015. 6(5): e01157-15.
8. Doench JG, Fusi N, Sullender M, Hegde M, Vaimberg EW, Donovan KF, Smith I, Tothova Z, Wilec CB, **Orchard R**, Virgin HW, Listgarten J, Root DE. Optimized sgRNA design to maximize activity and minimize off-target effects of CRISPR-Cas9. *Nature Biotechnology*. 2016. 34(2): 184-91.
9. Redmann V, Lamb CA, Hwang S, **Orchard RC**, Kim S, Razi M, Milam A, Park S, Yokoyama CC, Kambal A, Kreamalmeyer D, Bosch MK, Xiao M, Green K, Kim J, Pruett-Miller Sm, Ornitz DM, Allen PM, Beatty WL, Schmidt RE, DiAntonio A, Tooze SA, Virgin HW. Clec16A is critical for autolysosome function and purkinje cell survival. *Scientific Reports*. 2016.6:23326.
10. Martinez J, Cunha LD, Park S, Yang M, Lu Q, **Orchard R**, Li QZ, Yan M, Janke L, Guy C, Linkermann A, Virgin HW, Green DR. Noncanonical autophagy inhibits the autoinflammatory, lupus-like response to dying cells. *Nature*. 2016. 533(7601):115-9.
11. **Orchard RC***, Wilen CB*, Doench JG, Baldrige MT, McCune BT, Lee YC, Lee S, Pruett-Miller SM, Nelson CA, Fremont DH, Virgin HW. Discovery of a proteinaceous receptor for a norovirus. *Science*. 2016. 353(6302):933-6.
12. Biering SB, Choi J, Halstrom RA, Brown HM, Beatty WL, Lee S, McCune BT, Dominici E, Williams LE, **Orchard RC**, Wilen CB, Yamamoto M, Coers J, Taylor GA, Hwang S. Viral Replication Complexes Are Targeted by LC3-Guided Interferon-Inducible GTPases. *Cell Host and Microbe*. 2017. 22(1):74-85.
13. Weigele BA*, **Orchard RC***, Jimenez A*, Cox GW, Alto NM. A systematic exploration of the interactions between bacterial effector proteins and host cell membranes. *Nature Communications*. 2017. 8(1):532.
14. Lee S, Wilen CB, Orvedahl A, McCune BT, Kim K, **Orchard RC**, Peterson ST, Nice TJ, Baldrige MT, Virgin HW. Cell tropism of norovirus is determined by combinatorial action of a non-structural protein and a host cytokine. *Cell Host and Microbe*. 2017. 22(4):449-459.
15. Wilen CB, Lee S, Hsieh LL, **Orchard RC**, Desai C, Hykes BL Jr., McAllaster MR, Balce DR, Feehley T, Brestoff JR, Hickey CA, Yokoyama CC, Wang YT, MacDuff DA, Kreamalmeyer D, Howitt MR, Neil JA, Cadwell K, Allen PM, Handley SA, van Lookeren Campagne M, Baldrige MT, Virgin HW. Tropism for tuft cells determines immune promotion of norovirus pathogenesis. *Science*. 2018. 360(6385):204-208.
16. **Orchard RC#**, Wilen CB, Virgin HW#. Sphingolipid biosynthesis induces a conformational change in the murine norovirus receptor and facilitates viral infection. Accepted. *Nature Microbiology*.

* denotes equal contribution

denotes co-corresponding author