Jordan R. Willis

Ph.D.

Info

Born July 20th, 1985 Norfolk VA (USA)

Citizenship USA

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Profile

Objective Computational and molecular biologist working in the area of protein engineering

- 13 years experience with molecular biology
- 10 years experience with protein design, modeling and bioinformatics
- 9 years experience with protein production
- 9 years experience with next generation sequencing and analysis
- 5 years experience with cell display technology

Experience

2019- **Principal Scientist - Protein Engineer**, *Rejuvenate Bio*, San Diego, CA.
Engineer inducible systems and AAV capsid libraries

2018-2019 **Senior Scientist - Computational Biologist**, *RubrYc Therapeutics*, San Carlos, CA.
Engineer peptide baits that steer therapuetic antibody libraries. Research and development of computational design/ML strategies for *de novo* functional peptide-protein interfaces.

2014-2018 **Research Associate**, *The Scripps Research Institute*, La Jolla, CA.
Fusing computation modeling, high-throughput sequencing, and library display technologies in order to engineer HIV immunogens.

2009-2014 **Graduate Research Assistant**, *Vanderbilt University Medical Center*, Nashville, TN.
Computational design to answer specific questions about HIV immunology. The computational work was accomplished in the Meiler laboratory while the experimental laboratory work was conducted in the Crowe laboratory. My thesis work can be divided into four parts:

1. Multi-state antibody design to interrogate mechanisms for antibody polyspecificity.
2. Molecular mechanisms of HIV-1 CD4-binding site escape.
3. Determine how closely antibody repertoires from HIV-naïve individuals are to known broadly neutralizing antibodies against HIV.
4. Computational design of antibodies with increased neutralization breadth against diverse natural variants of the influenza hemagglutinin stem.

2007-2008 **Undergraduate Research Fellow**, *University of Missouri, Department of Chemistry*, Columbia, MO.
Lead optimization drug discovery of hypoxic-cell targeting molecules that treat tumors. Using the pharmacaphore Tirapazamine as a scaffold, I used combinatorial synthesis techniques to add organic groups and evaluate structural activity relationships.

Education

2014-2018 **Postdoctoral**, *The Scripps Research Institute*, La Jolla, CA.
PI: William Schief, Ph.D.

2008-2014 **Ph.D. Chemical and Physical Biology**, *Vanderbilt University Medical Center*, Nashville, TN.
Rational Antibody Design: From Mechanisms of Specificity, to Novel Vaccine Strategies
Advisors: James E. Crowe, Jr., M.D., Jens Meiler, Ph.D.

2004-2008 **B.S. Chemistry**, *Northwest Missouri State University*, Maryville, MO.

2004-2008 **B.A. Molecular Biology**, *Northwest Missouri State University*, Maryville, MO.

Specialized Computational Skills

Languages PYTHON, Java, C++, SQL, LaTeX, Javascript

Database Spark, Hadoop, MySQL, MongoDB, SQLite

Tools AWS, Cloud Computing, Jupyter Notebook, Git, Geneious

Specialized Experimental Skills

Dry-Lab Molecular modeling, design and big data analysis

- Development and application of the software suite Rosetta/PyRosetta
- GUI and Web development with Python
- Big data analytics with Python and Hadoop
- Protein structure prediction and design
- Similarity search and alignments
- Phylogeny and evolution
- Supercomputer cluster designer and administrator

Wet-Lab Protein production and analysis

- Mammalian library display and preparation
- HIV neutralization assays
- Lenti virus library engineering
- Cell sorting
- Biopysical characterization of protein-protein interactions - ELISA, SPR, and Octet
- Amplicon library preparation for NGS

Honors and Awards

Research and Scholarly Awards

2014-2018 Ragon Institute Fellow

2007-2008 NIH 5 T23 AI060571 HIV/AIDS Research Training Program

2010-2011 Steven's Research Scholarship, University of Missouri

2007-2008 Mary Marie Smith Chemistry Scholarship, Northwest Missouri State University

2006-2007 J. Gordon Strong Chemistry Scholarship, Northwest Missouri State University

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2004-2008 Tower Scholar, Northwest Missouri State University

Travel Awards

2012 Keystone HIV Vaccine Symposium Scholarship

2012 Chemical and Physical Biology Travel Award

2011 IBC Antibody Engineering Symposium Scholarship

Research Publications

2019 Steichen JM*, Lin YC*, Havenar-Daughton C*, Pecetta S*, Ozorowski G*, **Willis JR***, Toy L, Sok D, Liguori A, Kratochvil S, Torres JL, Kalyuzhniy O, Melzi E, Kulp DW, Raemisch S, Hu X, Bernard SM, Georgeson E, Phelps N, Adachi Y, Kubitz M, Landais E, Umotoy J, Robinson A, Briney B, Wilson IA, Burton DR, Ward AB, Crotty S, Batista FD, Schief WR, A generalized HIV vaccine design strategy for priming of broadly neutralizing antibody responses. *Science* - Preprint * Authors contributed equally

2017 Kulp DW, Steichen JM, Pauthner M, Hu X, Schiffner T, Liguori A, Cottrell CA, Havenar-Daughton C, Ozorowski G, Georgeson E, Kalyuzhniy O, **Willis JR**, Kubitz M, Adachi Y, Reiss SM, Shin M, de Val N, Ward AB, Crotty S, Burton DR, Schief WR, Structure-based design of native-like HIV-1 envelope trimers to silence non-neutralizing epitopes and eliminate CD4 binding. *Nat Commun* **8**: 1655

2017 Sarkar U, Hillebrand R, Johnson KM, Cummings AH, Phung NL, Rajapakse A, Zhou H, **Willis JR**, Barnes CL, Gates KS, Application of Suzuki-Miyaura and Buchwald-Hartwig Cross-coupling Reactions to the Preparation of Substituted 1,2,4-Benzotriazine 1-Oxides Related to the Antitumor Agent Tirapazamine. *J Heterocycl Chem* **54**: 155-160

2016 Hicar MD, Chen X, Sulli C, Barnes T, Goodman J, Sojar H, Briney B, **Willis J**, Chukwuma VU, Kalams SA, Doranz BJ, Spearman P, Crowe JE Jr, Human Antibodies that Recognize Novel Immunodominant Quaternary Epitopes on the HIV-1 Env Protein. *PLoS One* **11**: e0158861

2016 Boehme KW, Ikizler M, Iskarpatyoti JA, Wetzel JD, **Willis J**, Crowe JE Jr, LaBranche CC, Montefiori DC, Wilson GJ, Dermody TS, Engineering Recombinant Reoviruses To Display gp41 Membrane-Proximal External-Region Epitopes from HIV-1. *mSphere* **1**: None

2016 Finn JA, Koehler Leman J, **Willis JR**, Cisneros A 3rd, Crowe JE Jr, Meiler J, Improving Loop Modeling of the Antibody Complementarity-Determining Region 3 Using Knowledge-Based Restraints. *PLoS One* **11**: e0154811

2016 **Willis JR**, Finn JA, Briney B, Sapparapu G, Singh V, King H, LaBranche CC, Montefiori DC, Meiler J, Crowe JE Jr, Long antibody HCDR3s from HIV-naive donors presented on a PG9 neutralizing antibody background mediate HIV neutralization. *Proc Natl Acad Sci U S A* **113**: 4446-51

2015 **Willis JR**, Sapparapu G, Murrell S, Julien JP, Singh V, King HG, Xia Y, Pickens JA, LaBranche CC, Slaughter JC, Montefiori DC, Wilson IA, Meiler J, Crowe JE Jr, Redesigned HIV antibodies exhibit enhanced neutralizing potency and breadth. *J Clin Invest* **125**: 2523-31

2014 Briney BS, **Willis JR**, Finn JA, McKinney BA, Crowe JE Jr, Tissue-specific expressed antibody variable gene repertoires. *PLoS One* **9**: e100839

2014 Lin D, He H, Ji H, **Willis J**, Willard L, Jiang Y, Medeiros DM, Wark L, Han J, Liu Y, Lu B, Wolfberries potentiate mitophagy and enhance mitochondrial biogenesis leading to prevention of hepatic steatosis in obese mice: the role of AMP-activated protein kinase alpha2 subunit. *Mol Nutr Food Res* **58**: 1005-15

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2013 Combs SA, Deluca SL, Deluca SH, Lemmon GH, Nannemann DP, Nguyen ED, **Willis JR**, Sheehan JH, Meiler J, Small-molecule ligand docking into comparative models with Rosetta. *Nat Protoc* **8**: 1277-98

2013 **Willis JR**, Briney BS, DeLuca SL, Crowe JE Jr, Meiler J, Human germline antibody gene segments encode polyspecific antibodies. *PLoS Comput Biol* **9**: e1003045

2012 Briney BS, **Willis JR**, Hicar MD, Thomas JW 2nd, Crowe JE Jr, Frequency and genetic characterization of V(DD)J recombinants in the human peripheral blood antibody repertoire. *Immunology* **137**: 56-64

2012 Briney BS, **Willis JR**, Crowe JE Jr, Human peripheral blood antibodies with long HCDR3s are established primarily at original recombination using a limited subset of germline genes. *PLoS One* **7**: e36750

2011 Joyner AS, **Willis JR**, Crowe JE Jr, Aiken C, Maturation-induced cloaking of neutralization epitopes on HIV-1 particles. *PLoS Pathog* **7**: e1002234

In Progress **Willis JR**, Schief WR, Precursor frequency focused immunogen design for V1V2-apex bNAbs

References

Matt Greving, PhD
Co-Founder, VP Technology
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