

# YIQUAN WANG

[yiquan2@illinois.edu](mailto:yiquan2@illinois.edu) | Website: [www.yiquan2.com](http://www.yiquan2.com)

## Professional Summary

I am a highly motivated scientist with a multidisciplinary background in virology, immunology, structural biology, and artificial intelligence. My expertise spans the development of AI models for understanding the coevolutionary dynamics of viruses and the human immune system, particularly through viral and antibody sequence-structure-function relationships. With a deep understanding of high-throughput sequencing techniques, protein engineering, and computational biology, I aim to bridge the gap between experimental science and computational modeling to advance vaccine efficacy and immune therapies.

## Education

**2020 - Present** **University of Illinois at Urbana-Champaign**, Champaign, IL  
*Biochemistry, Doctor of Philosophy*

**2015 - 2019** **Chongqing University**, Chongqing, China  
*Bioengineering, Bachelor of Bioengineering*

## Professional Experience

**2020 - Present** **University Of Illinois at Urbana-Champaign**, Champaign, IL  
*Biochemistry (Carter Fellow), Doctor of Philosophy*  
Viral evolution, Antibody Engineering, Deep Learning, Model Explainability

**2022 - 2023** **Genentech Inc**, San Francisco, CA  
*Structural and Computational Biology, Intern*  
Graph Neural Networks; Protein Function; Antibody Design

**2019 - 2020** **The University of Hong Kong - Pasteur Research Pole**, HK  
*School of public health, Research Assistant*  
Viral evolution, Immune Responses, DNA/RNA seq

**2018 - 2019** **Chinese Academy of Sciences**, Shenzhen  
*Shenzhen Institutes of Advanced Technology, Visiting student*  
Mouse Models; In Vitro Translation System

**2017 - 2018** **Chongqing University**, Chongqing  
*Bioengineering, Undergraduate Researcher*  
Fluorescent Nanoparticles; Hierarchical Encapsulation Method

## Publications

\*Equal contribution, #Co-corresponding

### Preprints

Ouyang WO, Lv H, Liu W, Mou Z, Lei R, Pholcharee T, **Wang Y**, Dailey KE, Gopal AB, Choi D, Ardagh MR, Talmage L, Rodriguez LA, Dai X, Wu NC. Rapid synthesis and screening of natively paired antibodies against influenza hemagglutinin stem via oPool+ display. bioRxiv DOI: 10.1101/2024.08.30.610421

Teo QW\*, **Wang Y**\*, Lv H\*, Tan TJC, Mao KJ, Wu NC. Deep mutational scanning of influenza A virus NEP reveals pleiotropic mutations in its N-terminal domain. bioRxiv (2024): 2024-05.

Yang K, Liu J, Wu J, Yang C, Fung YR, Li S, Huang Z, Cao X, Wang X, **Wang Y**, Ji H. If llm is the wizard, then code is the wand: A survey on how code empowers large language models to serve as intelligent agents. arXiv preprint arXiv:2401.00812. 2024 Jan 1.

Lamers MM\*, Breugem TI\*, Mykytyn AZ\*, **Wang Y**, Groen N, Knoop K, Schipper D, van der Vaart J, Koopman CD, Zhang J, Wu DC, van den Doel PB, Bestebroer T, GeurtsvanKessel CH, Peters PJ, Muraro MJ, Clevers H, Wu NC, Haagmans BL. Human organoid systems reveal in vitro correlates of fitness for SARS-CoV-2 B.1.1.7. *bioRxiv* DOI: 10.1101/2021.05.03.441080

## 2024

**Wang Y**\*, Lv H\*, Teo QW, Lei R, Gopal AB, Ouyang WO, Yueng YH, Tan TJC, Choi D, Shen IR, Chen X, Graham CS, Wu NC. An explainable language model for antibody specificity prediction using curated influenza hemagglutinin antibodies. *Immunity* 57:2453-2465.e7 (2024)

## 2023

Wong LYR<sup>#</sup>, Odle A, Luhmann E, Wu DC, **Wang Y**, Teo QW, Ptak C, Sariol A, Lowery S, Mack M, Meyerholz DK, Wu NC, Radoshevich L, Perlman S<sup>#</sup>. Contrasting roles of MERS-CoV and SARS-CoV-2 internal proteins in pathogenesis in mice. *mBio* 14:e02476-23 (2023)

Teo QW\*, **Wang Y**\*, Lv H\*, Tan TJ, Lei R, Mao KJ, Wu NC. Stringent and complex sequence constraints of an IGHV1-69 broadly neutralizing antibody to influenza HA stem. *Cell reports*. 2023 Nov 28;42(11).

Lei R\*, Kim W\*, Lv H\*, Mou Z\*, Scherm MJ\*, Schmitz AJ, Turner JS, Tan TJC, **Wang Y**, Ouyang WO, Liang W, Rivera-Cardona J, Teo C, Graham CS, Brooke CB, Presti RM, Mok CKP<sup>#</sup>, Krammer F<sup>#</sup>, Dai X<sup>#</sup>, Ellebedy AH<sup>#</sup>, Wu NC<sup>#</sup>. Leveraging vaccination-induced protective antibodies to define conserved epitopes on influenza N2 neuraminidase. *Immunity* 56:2621-2634.e6 (2023)

Lei R, Garcia AH, Tan TJ, Teo QW, **Wang Y**, Zhang X, Luo S, Nair SK, Peng J, Wu NC. Mutational fitness landscape of human influenza H3N2 neuraminidase. *Cell reports*. Jan 31;42(1). (2023)

## 2022

Yuan M, **Wang Y**, Lv H, Tan TJC, Wilson IA, Wu NC. Molecular analysis of a public cross-neutralizing antibody response to SARS-CoV-2. *Cell Reports* 41:111650 (2022)

Lei R, Tan TJC, Hernandez Garcia A, **Wang Y**, Diefenbacher M, Teo C, Gopan G, Tavakoli Dargani Z, Teo QW, Graham CS, Brooke CB, Nair SK, Wu NC. Prevalence and mechanisms of evolutionary contingency in human influenza H3N2 neuraminidase. *Nature Communications* 13:6443 (2022)

Liu T, **Wang Y**, Tan TJC, Wu NC<sup>#</sup>, Brooke CB<sup>#</sup>. The evolutionary potential of influenza A virus hemagglutinin is highly constrained by epistatic interactions with neuraminidase. *Cell Host & Microbe* 30:1363-1369.e4 (2022)

Liang W, Tan TJC, **Wang Y**, Lv H, Sun Y, Bruzzone R, Mok CKP<sup>#</sup>, Wu NC<sup>#</sup>. Egg-adaptive mutations of human influenza H3N2 virus are contingent on natural evolution. *PLoS Pathogens* 18:e1010875 (2022)

**Wang Y**\*, Yuan M\*, Lv H, Peng J, Wilson IA, Wu NC. A large-scale systematic survey reveals recurring molecular features of public antibody responses to SARS-CoV-2. *Immunity* 55(6):1105-1117 (2022). (**Cover**)

## 2021

**Wang Y**\*, Lei R\*, Nourmohammad A, Wu NC. Antigenic evolution of human influenza H3N2 neuraminidase is constrained by charge balancing. *eLife* 10:e72516 (2021)

Lv H\*, Tsang OTY\*, So RTY, **Wang Y**, Yuan M, Liu H, Yip GK, Teo QW, Yihan Lin Y, Liang W, Wang J, Ng WW, Wilson IA, Peiris JSM, Wu NC<sup>#</sup>, Mok CKP<sup>#</sup>. Homologous and heterologous serological response to the N-terminal domain of SARS-CoV-2 in humans and mice. *European Journal of Immunology* 51:2296-2305 (2021)

Tan TJC\*, Yuan M\*, Kuzelka K, Padron GC, Beal JR, Chen X, **Wang Y**, Rivera-Cardona J, Zhu X, Stadtmueller BM, Brooke CB, Wilson IA<sup>#</sup>, Wu NC<sup>#</sup>. Sequence signatures of two public antibody clonotypes that bind SARS-CoV-2 receptor binding domain. *Nature Communications* 12:3815 (2021)

Lamers MM, Mykytyn AZ, Breugem TI, **Wang Y**, Wu DC, Riesebosch S, van den Doel PB, Schipper D, Bestebroer T, Wu NC, Haagmans BL. Human airway cells prevent SARS-CoV-2 multibasic cleavage site cell culture adaptation. *eLife* 10:e66815 (2021)

## 2020

Lv H\*, Wu NC\*, Tsang OTY\*, Yuan M, Perera RAPM, Leung WS, So RTY, Chan JMC, Yip GK, Chik TSH, **Wang Y**, Choi CYC, Lin Y, Ng WW, Zhao J, Poon LLM, Peiris JSM<sup>#</sup>, Wilson IA<sup>#</sup>, Mok CKP<sup>#</sup>. Cross-reactive antibody response between SARS-CoV-2 and SARS-CoV infections. *Cell Reports* 31:107725 (2020)

## 2018

**Wang, Y**\*, Wei Zhou\*, Feng Chen, Kaiyao Sun, Jixi Zhang, Ezgi Özliselib, and Jessica M. Rosenholm. "Terbium complexes encapsulated in hierarchically organized hybrid MOF particles toward stable luminescence in aqueous media." *CrystEngComm* 20.30 (2018): 4225-4229.

## Talks & Presentations

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2024-07	<b>CEIRR Annual Network Meeting 2024</b> <i>Talk: Predicting Adaptive Immune Receptor Repertoire Functionality using Deep Learning Models</i>
2024-06	<b>American Society for Virology Annual Meeting</b> <i>Talk: An Explainable Language Model for Antibody Specificity Prediction</i>
2024-02	<b>Biophysical Society</b> <i>Poster: An Explainable Language Model for Antibody Specificity Prediction</i>
2022-06	<b>Keystone symposia</b> <i>Poster: A large-scale systematic survey reveals recurring molecular features of public antibody responses to SARS-CoV-2</i>
2022-07	<b>American Society for Virology Annual Meeting</b> <i>Talk: Antigenic evolution of human influenza H3N2 neuraminidase is constrained by charge balancing</i>

## Awards & Fellowships

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2024	Art of Science Image Contest Winner
2024	Biophysical Society Travel Award
2023	"Life Inspiring" Art Competition Second Place Winner
2023	HERBERT E. CARTER FELLOWSHIP
2022	Biochemistry Department Graduate Student Conference (Travel) Awards
2017	"Meritorious Winner" in The Mathematical Contest in Modeling, COMAP
2015 - 2019	Chongqing University Excellent Student Comprehensive Scholarship
2015 - 2019	National Encouragement Scholarship