**Chuangqi Wang, PhD**

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**Research Background\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Computational modeling for cell imaging, system biology and immunology in infectious disease

Deep learning and machine learning for time course analysis in biomedical data

**Professional Experience\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_**

**Postdoctoral Associate**,Biological Engineering, **Massachusetts Institute of Technology (MIT)**, US

PI**:** Dr. Douglas Lauffenburger (System Biology/Computational Immunology Lab) Oct.2019 – Present

**Research Associate**, **Worcester Polytechnic Institute (WPI)**, US 2014 – 2015

PI: Dr. Patrick Flaherty (now in Statistics Dep. in UMass Amherst, Statistical Lab)

**Research Associate, Chinese Academy of Sciences,** China 2012 – 2013

PI: Dr. Xinyu Wu. Center for Biomimetic Systems

**Education \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_**

**Ph.D.** inBiomedical Engineering, **WPI**, US2015 – Oct. 2019

“Machine learning pipelines for deconvolution of cellular and subcellular heterogeneity from cell imaging”

Advisor: Dr. Kwonmoo Lee (now in Boston Children’s Hospital/Harvard Medical School)

**M.S.** in Electronics Engineering and Computer Science, **Peking University (PKU)**, China 2009 – 2012

Designated Emphasis: machine learning, robotics, motion planning.

**B.S.** in Computer Science, **Jilin University** (with Honors), China 2005 – 2009

**Selected Publications \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_**

**System Biology in Infectious Disease & Translational Medicine:**

1. Y. C Bartsch\*, **C. Wang**\*, S. Fischinger, C. Atyeo, T. Zohar, J. Burke, A. G Edlow, A. Fasano, …, L. R Baden, E. Wood Karlson, D. A Lauffenburger, Lael M Yonker# and G. Alter#, [Humoral signatures of protective and pathological SARS-CoV2 infection in children](https://www.nature.com/articles/s41591-021-01263-3), ***Nature Medicine***, 1-9, 2021.
2. Chaillon\*, **C. Wang**\*, T. Schlub, W. Yu, D.A. Lauffenburger, D.M. Smith, B. Juegl, Tissue landscape of HIV antibody neutralization susceptibility, *Conference on Retroviruses and Opportunistic Infections (****CROI)***, 2021.
3. T. Zohar\*, C. Loos\*, S. Fischinger\*, C. Atyeo\***, C. Wang**, M. D. Slein, J. Burke, J. Yu, J. Feldman, B. M. Hauser, T. Caradonna, A. G. Schmidt, Y. Cai, H. Streech, E. T. Ryan, D. H. Barouch, R. C. Charles, D. A. Lauffenburger# &G.Alter#. [Compromised humoral functional evolution tracks with SARS-CoV-2 mortality](https://pubmed.ncbi.nlm.nih.gov/33207184/). ***Cell***, 183(6), 1508-1519, 2020.
4. J. D. Herman\*, **C. Wang**\*, C. Loos\*, D.A. Lauffenburger, L. Profski, G. Alter. Functional Antibodies in COVID-19 Convalescent Plasma, In manuscript, 2021.
5. M. J. Lee, **C. Wang**, M. Carroll, …, D.A. Lauffenburger. Computational interspecies translation between Alzheimer’s Disease mouse models and human subjects identifies innate immune complement, TYROBP, and TAM receptor agonist signatures, distinct from influences of aging, Submitted, 2021.

**Cell Imaging & Machine Learning:**

1. **C. Wang**\***,** H. J. Choi\*, S. Kim, …, K. Lee, [Deconvolution of subcellular protrusion heterogeneity and the underlying actin regulator dynamics from live cell imaging](https://www.nature.com/articles/s41467-018-04030-0), ***Nature Communications***, 9(1), pp.1-17, 2018.
2. **C. Wang**, H., Choi, L. Woodbury, K. Lee. Deep learning-based subcellular phenotyping of leading edge dynamics reveals fine differential drug responses at the single cell level, In manuscript, 2021.
3. K. Vaidyanathan\*, **C. Wang**\*, Y. Yu, A. Krajnik, M. Choi, B. Lin, J. Kolega, K. Lee#, Y. Bae#, [Machine learning approach reveals heterogeneous responses to FAK and Rho GTPases inhibition on smooth muscle spheroid formation,](https://www.biorxiv.org/content/10.1101/2020.01.30.927616v1) In review, ***bioRxiv*** 927616, 2020.
4. H. Choi, **C. Wang**, X. Pan, M. Cao, J. Brazzo, Y. Bae, K. Lee, Emerging machine learning approaches to phenotyping temporally heterogeneous cellular processes, In review, 2020
5. F. Zhang, **C. Wang**, A. C. Trapp, P. Flaherty, [A global optimization algorithm for sparse mixed membership matrix factorization new advances in statistics and data science](https://link.springer.com/chapter/10.1007/978-3-030-15310-6_7), ***Contemporary Biostatistics with Biopharmaceutical Applications,*** pp 129-156, Springer, 2019.
6. S. Kim**\***, **C. Wang\***, B. Zhao, H. Im, J. Min, N. Choi, C. M. Castro, R. Weissleder, H. Lee#, K. Lee#. [Deep transfer learning-based hologram classification for molecular diagnostics.](https://www.nature.com/articles/s41598-018-35274-x) ***Scientific Reports***, 8:17003, 2018.
7. **C. Wang**, X. Zhang, Y. Chen, K. Lee. vU-net: [Accurate cell edge segmentation in time-lapse fluorescence live cell images based on convolutional neural network](https://www.biorxiv.org/content/10.1101/191858v1.full), ***bioRxiv*** 191858, 2017
8. **C. Wang**, S. Kang, E. Kim, X. Zhang, H. J. Choi, A. Choi, K. Lee, [Edge detection of cryptic lamellipodia assisted by deep learning](https://www.biorxiv.org/content/10.1101/181263v2), ***bioRxiv***181263, 2017

**Robotics and Path Planning:**

1. H. Liu, **C. Wang**. [Collision probability based safe path planning for mobile robots in changing environments.](https://www.scientific.net/AMM.197.401) ***Applied Mechanics and Materials***. vol. 197. pp. 401-408, (2012).
2. **C. Wang**, B. Chen and H. Liu. [Path updating tree based fast path planner for unpredictable changing environments. IEEE International Conference on Robotics and Biomimetics](https://ieeexplore.ieee.org/document/6491185) (***ROBIO*** 2012). pp. 1529-1535. Guangzhou, China. Dec 11-14, (2012).
3. H. Liu, T. Zhang, **C. Wang**. [A ’capacitor’ bridge builder based safe path planner for difficult regions identification in changing environments. IEEE/RSJ International Conference on Intelligent Robots and Systems](https://ieeexplore.ieee.org/document/6386059) (***IROS***). pp. 3179-3186. Algarve, Portugal. Oct 7-12, 2012.
4. H. Liu, J. Wang and **C. Wang**. Sub-goal choosing and updating strategy based on hierarchy sampling strategy. Journal of Huazhong University of Science and Technology (Natural Science Edition). vol. 39. pp. 208-211, 2011(in Chinese).
5. **C. Wang**, H. Liu, Motion planning method for robots in dynamic environments based on improved particle swarm optimization, the 13nd China National Conference on Artificial Intelligence (CAAI 2009). pp. 393-399. Beijing, China. Oct 25-28, 2009 (in Chinese).

\*Equal Contribution, #Co-corresponding authors.

**Selected Talks \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_ \_**

Workshop: “System Serology/Machine Learning”, C. Loos, A. Nilsson & **C. Wang** 2020

A machine learning approach to devonolute the subcellular protrusion heterogeneity

**Oral talk**: Single Cell Biology Keystone Symposium, Colorado January, 2019

**Poster**: International Society for computational biology (ISCB), Chicago July 2018

**Poster**: Graduate Research Innovation Exchange (GRIE), WPI 2017, 2018

**Poster**: ASCB/EMBO, Philadelphia December, 2017

Path Updating Tree based fast path planner for unpredictable changing environments

**Oral talk**: IEEE International Conference on Robotics and Biomimetics (*ROBIO*) December, 2012

**Awards, Honors and Notable Service \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Reviewer in Scientific Reports 2019

Graduate Travel Award, WPI 2017, 2018

Reviewer in New England Statistics Symposium (NESS) 2018 Reviewer in International Conference on Robotics and Automation **(**ICRA), IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM) 2013

Session Chair of Motion Planning I in ROBIO 2012

Judge in Shenzhen Youth Robot Competition 2010, 2011

Studying Excellence Award, Peking University 2010

National Endeavor scholarship / National Endeavor scholarship, China Ministry of Education 2006-2008

Outstanding Student Scholarship, Jilin University 2007, 2006

**Professional Skills\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Computation/Statistics:** representation learning (CNN, Autoencoder, LSTM), unsupervised learning (density peaks), supervised learning (MLP, SVM, RF), time series data analysis, convex and global optimization.

**Programming:** Proficient in R, Python, MATLAB and C++.Competent in ImageJ.

**Patents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_**

An Intelligent Education Robot (CN201320117097.5) J. Sun, **C. Wang**, P. Jiang, etc. August, 2013

Chinese Academy of Sciences/Shenzhen Institute of Advanced Integration Technology

A Robot Path Planning Framework inspired by Bionics in Dynamic Environments (CN201310233773.X) Peking University. H. Liu, **C. Wang**, etc. September, 2013

**Teaching Experience\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Mentee, WPI**

Melody Yu (Undergraduate Student, Biological Engineering, MIT) Oct.2020 – Present

Xiang Pan and Yudong Yu (MS student, Biomedical Engineering, WPI) May. 2018 – May. 2019

Tessa Curtis (REU program, Biomedical Engineering, UNC) Summer, 2019

Xitong Zhang (MS student, Data Science, WPI) March, 2017 – May, 2018

Lucy Woodbury (REU program, Biomedical Engineering, University of Arkansas) Summer, 2018

Yenyu Chen (Undergraduate student, Biomedical Engineering, WPI) Summer, 2017

**Teaching Assistant, WPI**  2015 - 2016

Biomedical Data Analysis, Biomedical Engineering Design, Introduction of Biomedical Engineering

**Teaching Assistant, Peking University** 2010 - 2012

Image Processing, Robot Technologies