# Bole (James) Pan

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## EDUCATION

**Columbia University**, Columbia College, New York, NY
Bachelor of Arts, Computer Science, Combination track with Biology Expected May 2024
GPA: 4.10; Dean's List (all semesters)

*Relevant Coursework:* Multivariable Calculus, Linear Algebra, Discrete Mathematics, Ordinary Differential Equations, Data Structures in Java, Advanced Programming (C), Analysis of Algorithms, Databases, Computational Robotics, Probability Theory, Statistical Inference, Machine Learning, Statistical Methods in Neural Data, Introductory Biology, Intensive Organic Chemistry I-II

*Languages***:** Python, Java, C, React Native, Unity, LaTeX, MySQL, Linux.

## GRANTS AND AWARDS

Robert K. Kraft Global Fellowship (2022)
Summer Undergraduate Research Fellowship (2022)
Columbia Mathematical Modeling Contest Second Place (2022)
Neng Teng Fong Internship Fund (2021)
12th China Youth Science and Technology Innovation Award Recipient (2020)
Regeneron International Science and Engineering Fair Finalist (2020)
Stockholm Junior Water Prize Finalist (2019)
S. -T. Yau High School Science Award (Chemistry) Global Top 10 (2019)

## RESEARCH EXPERIENCE

**Columbia University, Department of Biological Sciences**
*Research Program Fellow*, May 2022 – Present
Advisors: Dr. Darcy Kelley, Harold Weintraub Professor; Young Mi Kwon
Investigated the evolution of vocal communication in African clawed frogs, *Xenopus*. Developed computational pipelines for speech identification using digital signaling and stochastic processes. Abstract accepted for presentation at Society for Integrative and Comparative Biology (SICB) Annual Meeting.

**Stony Brook University, Department of Materials Science and Chemical Engineering**
*Garcia Research Scholar*, June 2019 – August 2020
Advisors: Dr. Miriam Rafailovich, Distinguished Professor; Dr. Yuan Xue
Developed a flame-retardant hydrogel to protect firefighters from burns. Devised quantitative models to understand heat diffusion mechanisms. Presented at Stony Brook Fire Dept. and Israel Chemicals Ltd.

**Sun Yat-sen University, School of Chemistry**
*National Science Talent Program Scholar*, December 2017 – December 2019
Advisor: Dr. Yexiang Tong, Professor of Chemistry and Materials Science

Research on electrosorption and photocatalysis fully funded by China Association for Science and Technology. Selected as 1 of 12 students to receive Diploma of Excellence out of 1000+ nationwide.

## RELEVANT PROJECTS

**Clusterless decoding of mouse choices based on Point-wise Neural Network**
*STAT8201 Class Project*, September – December 2022
Advisors: Dr. Liam Paninski, Professor of Statistics and Neuroscience; Yizi Zhang
Proposed and implemented a permutation-invariant deep neural network based on PointNet architecture to process mouse electrophysiology data. Achieved performances on par with the state-of-the-art decoding methods. Exploring further possibilities in neural-network-based clusterless decoding.

**Biological Computations in Human Cortical Pyramidal Neurons: A Literature Review**
*COMS4995 Class Project*, April – May 2022
Advisors: Prof. Christos Papadimitriou, Prof. John Morrison
Through literature review, proposed that three key attributes of human cortical pyramidal neurons could contribute to computational capabilities that make these cells central to human intellectual achievement.

**Dora.** *ETHSF Hackathon*. Selected participant. San Francisco, CA, November 2022
Built a decentralized knowledge-sharing platform webapp prototype using React.js. Winner of three awards from Lens Protocol, XMTP, and Worldcoin.

**EnGauge.** *HackMIT*. Selected participant. Boston, MA, October 2022
Built a web app to increase in-person lecture participation. Developed feedback feature with HTML/CSS/JS & Firebase, implemented NLP algorithm for question grouping, deployed using Heroku.

## INDUSTRY EXPERIENCE

**Amazon, Inc.**
*Software Development Engineer (SDE) Intern*, June – August 2023
Incoming SDE intern at Amazon Web Services (AWS) at Seattle, WA.

**China International Capital Corporation**
*Analyst Intern*, June – August 2021
Supervisor: Liming Zhao, Executive Director, CICC Wealth Management
Streamlined data acquisition by writing a selenium webdriver-based program to scrape real-time information from China SEC website. Led a team of interns to complete reports to close a 600 million RMB deal with biotech giant Baiyunshan Pharmaceutical Holding Co. (600332.SS).

## LEADERSHIP/SERVICE

**Columbia University Systems Biology Initiative**
*Vice President*, November 2021 – Present
Oversaw event promotion and finances, increasing club funding by $3000. Organized visits startup incubators. Produced podcast series BioBytes and BioWorks to communicate systems biology to public.

**Columbia College Student Council**
*Class of 2024 Representative*, October 2022 – Present

Elected by peers to represent the interest of the class. Spearheaded campus life events including CC24 Brooklyn Nets Game, Explore NYC Initiative for CC, and After Hour at Luna Park.

## PUBLICATIONS

**Pan, B**., Kwon, Y., Bagnato-Colin, E., Kelley, D. (2023). Ethology and evolution of courtship vocalization in Xenopus. *Society for Integrative and Comparative Biology (SICB) Annual Meeting 2023*. (Abstract ID: 815. Linked here)

Xue, Y., Yang, F., Li, J., Zuo, X., **Pan, B.**, Li, M., Quinto, L., Mehta, J., Stiefel, L., Kimmey, C., Eshed, Y., Zussman, E., Simon, M., & Rafailovich, M. (2021). Synthesis of an effective flame-retardant hydrogel for skin protection using xanthan gum and resorcinol bis(diphenyl phosphate)-coated starch. *Biomacromolecules*, *22*(11), 4535–4543. https://doi.org/10.1021/acs.biomac.1c00804

**Pan, B.**, Wang, Y., Li, H., Yi, W., & Pan, Y. (2020). Preparation and electrosorption desalination performance of peanut shell-based activated carbon and $MOS_2$. *International Journal of Electrochemical Science*, *15*, 1861–1880. https://doi.org/10.20964/2019.12.74

Islam, D., Uddin, M. H., **Pan, B.**, & Joy, M. M. A. (2020). Flexible and high-energy dense yarn-shaped supercapacitor based on Ni-carbon nanotubes framework. *Chemical Physics Letters*, *760*, 138007. https://doi.org/10.1016/j.cplett.2020.138007

**Pan, B.**, Tan, H., Mao, B., Shen, Y., Lu, Z., Pan, Y., & Zuo, W. (2019). An ecological compensation model for Liuxi River basin based on emission rights. *Journal of Management and Sustainability*, *9*(2), 128. https://doi.org/10.5539/jms.v9n2p128

Xiao, X., Lin, Y., **Pan, B**., Fan, W., & Huang, Y. (2018). Photocatalytic degradation of methyl orange by $BiOI/Bi_4O_5I_2$ microspheres under visible light irradiation. *Inorganic Chemistry Communications*, *93*, 65–68. https://doi.org/10.1016/j.inoche.2018.05.009

## MEETINGS AND PRESENTATIONS

Society for Integrative and Comparative Biology (SICB) Meeting, Austin, TX, January 2023. (Poster)

Shanghai Science Festival 2021, Shanghai, China, May 2021 (One of four Teen Innovators invited)

Sigma Xi 2020 Annual Meeting & Student Research Conference, Online, November 2020. (Oral)

Shanghai International Youth Science and Technology Expo, Online, August 2020. (Best Poster Award)

American Chemical Society (ACS) Spring 2020 National Meeting & Expo, Philadelphia, PA, March 2020. (Poster ID: 3297001)

Materials Research Society (MRS) Fall 2019 Meeting & Exhibit, Boston, MA, December 2019. (Poster ID: 3277655)

Second World Laureates Association (WLA) Forum, Shanghai, China, October 2019. (Invited Young Science Innovator; attendees include 45 Nobel Prize Laureates, 21 other world-class award winners)

World Water Week, Stockholm, Sweden, August 2019. Co-drafted the "Youth Statement on Climate Change", which was endorsed by H.R.H Crown Princess Victoria of Sweden, sent to United Nations General Assembly, and addressed at United Nations Climate Change Conference (COP25)

Japan-Asia Youth Exchange Program 2018 & Sakura Science Conference, Nagoya, Japan, July 2018. (one of twelve students selected by Ministry of Science and Technology of China)

## SKILLS

**Languages:** Mandarin (Native), English (Bilingual), Cantonese (Conversational)