



## The Pursuit of Dream

### *Selected Stories of Zhiyuan Students*

Zhiyuan has cultivated a number of prominent students who have the quality of scientific passion, curiosity and innovative ability. Their stories fully embody “curiosity is at the heart of learning”.

**Andi Tan: An Investigator into the Dark**

**Jinzi Huang: “Play” Generates Curiosity**

**Lujing Chen: Zhiyuan, the Gate to Science**

**Jiaqi Yin: Committed to a Beloved Career**

**Zhuoyue Zhao: Indulging in the “Cradle of Scientists”**



More information: <http://zhiyuan.sjtu.edu.cn/students>



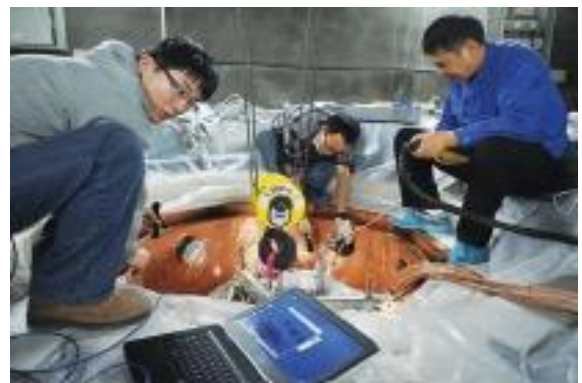
## Andi Tan: An Investigator into the Dark



Andi Tan, a graduate from the class of 2012 in Mathematics and Physics, Zhiyuan College, Shanghai Jiao Tong University, is currently a doctoral student at the University of Maryland. He is detecting the “dark matter” in the world’s deepest underground laboratory and responsible for PandaX-II in an underground laboratory in Jinping, China.

In 2009, a freshman of Physics, Andi was exceptionally enrolled by David Cai, a distinguished expert in the “Thousand Talents Program”, into the first science class, a cultivation platform for top-notch innovative talents, and supervised by a number of science masters who were keen on teaching.

Xiangdong Ji’s (another distinguished expert in the “Thousand Talents Program”) lecture on the “dark matter” convinced Andi of evidences of the existence of dark matter in astronomical observation and cosmology. From the lecture, Andi also learned that the study of the dark matter has contributed to the further analysis of the formation of the universe. Strongly interested in the dark matter, he applied for partnership in Professor Xiangdong Ji’s research group. As an undergraduate student, he had never thought of following an extraordinary mentor in the world’s cutting-edge scientific research. The monotonous sorting of screws rendered him the recognition of scientific thinking embedded in a tiny part of complicated experiments. After repeated program design and dozens of periodic experiments, he accomplished vacuum, low temperature and high pressure coupling and other difficult actions, and achieved the first success in developing low temperature high voltage wire. Xiangdong Ji, his mentor, was deeply impressed by Andi’s strong innovativeness, skilled research operations and readiness to explore the

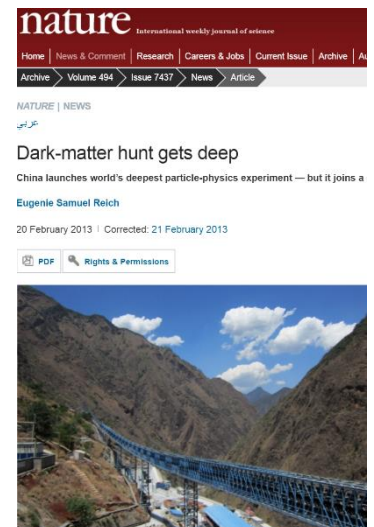


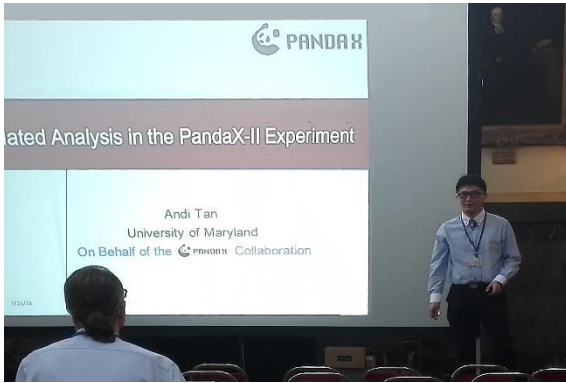


unknown. Ji commented on him as follows, “Andi is equipped with strong responsibility, active thinking and high efficiency. He has made a great contribution on designing and manufacturing low temperature high voltage wire and constructing air cycle system.” In Andi’s senior year, his B. S. degree thesis “An Experimental Study of Proportional Scintillation in Liquid Xenon” was granted to be an Excellent B. S. Degree Thesis of Shanghai Jiao Tong University. Having discovered his real interest, Andi decided to work under Professor Xiangdong Ji as a doctorate student to further detect the dark matter. He stated, “My study at Zhiyuan College helped me build up my dream and acknowledge the meaning of life!”

“Nature” was eyeing the work in China’s Jinping underground laboratory and predicted the Jinping Mountain “possibly will become the world’s best underground laboratory.” After graduating from Zhiyuan College, Andi departed to University of Maryland (one of the cooperating organizations of PandaX experiments) for PhD. He spent almost the whole of his first PhD year in Jinping lab, primarily responsible for the Panda X-I of design and installation of probes and wires, optimization and maintenance of refrigeration system, operation and improvement of the gas system, debugging of circulatory system and the design and debugging of radioactive source

calibration system. In his third PhD year, he is responsible for field coordination of Panda X-II, and system upgrade of both Panda X-I and Panda X-II, installation of probe and operation of Panda X-II. He also played an important role in Panda X-II experimental data analysis. The poor remote mountainous area and the plain life on the work site added to the heavy work load. His acquaintance with Jianglai Liu, one of the “Thousand Young Talents”, made him aware of the distinction of being the world’s top-notch young scientist, and strengthened Andi’s determination in scientific pursuit. After one year joint debugging, Panda X Phase II lab finally completed Xenon packing before the 2016 Chinese New Year and entered stable operation in March.





In 21<sup>st</sup> July 2016, at the bi-annual international dark matter conference, Panda X lab group announced to the world the first result of Panda X-II, meaning that its detection sensitivity had reached the world's highest level. Andi Tan reported the process of detailed analysis of experimental data at the conference. He emotionally confessed that "I am proud of myself for having suffered from frustration, but

conquered all sorts of difficulties in probe development and operation, and finally achieved the worlds' top sensitivity. The most exciting thing for a scientific researcher is to advance one more step beyond of the edge of human cognition." After the conference, Andi was invited to Fermilab and University of Rochester to deliver conference reports.

On 26<sup>th</sup> July, Andi submitted the conference reports as the first author to the national top Physics periodical *Physical Review Letters*, and received the publication information promptly on 17<sup>th</sup> August. In 16<sup>th</sup> September, the article *Dark Matter Results from First 98.7 Days of Data from the PandaX-II Experiment* published and recommended by the chief editor as Editor's Suggestion and the Panda X-II



detector was published on the cover of this periodical. Andi confessed, "Every meal and quick noodles had eaten in the lab over the past two years, every 8 hour daily shifts to catch up with the program, every blister on fingers, every midnight awoken by slow control alarm and drove to the lab for emergent equipment maintenance, every time tortured by the out of operation detector but other international competitors still continued, every time comprehended from data analysis...all vividly. Not all the effort rewarded. I am very grateful all the time that working with so brilliant team members and mentors to pursue physical goal, even admitted by the international counterparts. Although we haven't found particles of dark matters, the exploration to nature will never cease! Stay hungry, stay foolish!"



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



In July 2016, Andi was invited to Zhiyuan College to speak in 2016 Undergraduates Commencement on behalf of alumni. He set his own experience as an example to encourage every student find out their careers, to experience the fulfilment awakened by dream, to achieve great ambition. If they became scientific masters, the future decisions would influence the majority.”

Andi on behalf of a large number Zhiyuan students who are on the way to pursue science, and his experience interprets the spirit of Zhiyuan that pursue for dream and embrace the world!

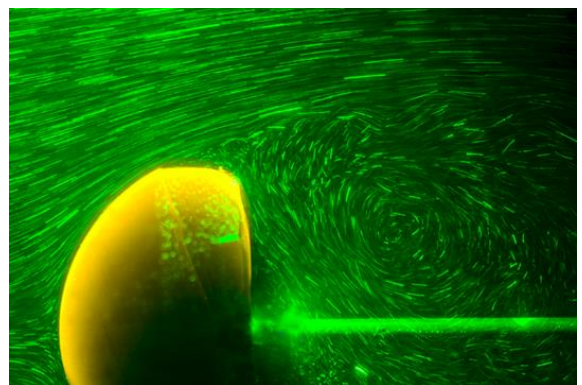


## Jinzi Huang: “Play” Generates Curiosity



How many licks does it take to consume a lolly? Jinzi Huang, a graduate of Mathematical and Physical Science from the class of 2013, Zhiyuan College, Shanghai Jiao Tong University, now a PhD student at Courant Institute of Mathematical Science, New York University, worked with his team and got the answer during an experiment on the property of dissolution of solid. They put a lolly in a pipe, introduced water flow at different speeds through the pipe, and recorded the process of dissolution of the lolly with time-lapse photography. They noticed that the lolly remained in almost the same shape at the last moment before getting completely dissolved, regardless of their original shape and the flow rate. They thus predicted that, according to the rule of dissolution of solid, it takes about 1000 licks to dissolve a lolly of 1cm in diameter. This research won the Pineapple Science Prize which is known as China’s “Ig Noble Prize” with the slogan of “Salute to Curiosity”.

The lolly research is derived from his fascination on the transformation process from solid to fluid. He is always trying to solve the discipline of solid dissolving in water. The inspiration of this research is contributed to his four years learning in Zhiyuan. Huang transferred from Mechanical and Dynamic Engineering College to Zhiyuan College. He was once confused of the research interest,



then indulged himself in the open, inclusive, encouraging environment in Zhiyuan, transformed from Laser Plasma to Computational Neuroscience, and shifted among different labs to choose, attempt and explore. After meeting Professor David Cai, an expert in the “Thousand Talents Program”, he entered Professor Hepeng Zhang’s soft material lab and finalized his object of study: Fluid Mechanics. He self-learned all the



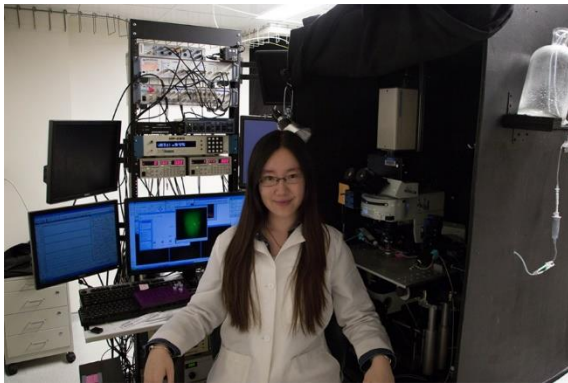
knowledge of Mathematics and the fundamental fluid dynamics and his graduation thesis is also relevant filed of “The Self-Driven Swimmers in Low Reynolds”. He said “Never give up and always insist on. The raindrops, the surface waves ignites my innate intimacy with water. Study and research are important parts that I enjoy my college life and trigger my increasing curiosity.” Upon graduation, he decided to continue his study of Fluid Dynamics and went to Courant Institute, New York University as doctorate student.

Jinzi Huang loves photography. He has another identity----Campus Media Photographer. A campus magazine of Shanghai Jiao Tong University interviewed him and thus described his photography “Born and growing up in Inner Mongolia, he captures sumptuous colors, focuses on magnificent scenes and concerns social reality.” At Shanghai Jiao Tong University, his unique style of photography was acknowledged, and he was nominated as Jiao Tong University Chief Photographer and admitted as Member of the Association of Inner Mongolian Photographers. He won a photography competition of Shanghai Jiao Tong University.

Interest in water, curiosity for dynamics, and talent in art allows Jinzi Huang to apply his knowledge of fluid dynamics to solving the trifles in daily life. Zhiyuan College is the cradle of Huang’s academic dream. “Jinzi is certainly more mature than students at his age, that is, he has an independent mind. He is wise enough to think before he acts, and he knows how to plan his future. Once determined, he aims at and persists in his pursuit. He is very skillful in operation, and he enjoys his time in the lab.” Hepeng Zhang, Fellow of Natural Science Research Institute and Project Mentor of Jinzi during his undergraduate years, thus evaluated him.



## Lujing Chen: Zhiyuan, the Gate to Science



Lujing Chen, a graduate of Life Science from the class of 2014, Zhiyuan College, Shanghai Jiao Tong University, is currently a Ph. D. student at Medical School, John Hopkins University, the United States.

During the four years at Zhiyuan College, the free academic atmosphere allowed Lujing to happily complete her courses and take many different specialized courses. There and then, her knowledge expanded and her interest developed.

At Zhiyuan, she had many opportunities to communicate with distinguished scholars in different academic fields. When the famous personages turned from characters in media articles into teachers on the teacher's stand, Lujing was not only overwhelmed by their academic accomplishments but also by their devotion to work and comprehension of life. In a Biochemical class, Lujing fortunately met for the first time with Professor Zhimin Zhou from Yale University, and it was also the first time for Prof. Zhou to be in Zhiyuan. The interesting content of that class triggered Lujing's strong interest in biology.

Zhiyuan College offers overseas communication for distinguished students, which enabled Lujing to join the world's cutting-edge academic community. Owing to that platform, she was able to broaden her horizon and pursue overseas study earlier than her peers. In the sophomore year at Zhiyuan, she obtained an offer from the Pennsylvania State University and entered mentor Gong Chen's lab. There she started her Ph. D. study in advance and it helped her make up her mind in continuing academic research. In her senior year, with the support and encouragement of Zhiyuan College, she entered Prof. Zhimin Zhou's lab for her graduation project.





Lujing is always grateful to Prof. Zhou’s instruction and inspiration. When she entered Yale, she was only armed with knowledge of electrophysiology in theory, and it was Prof. Zhou who guided her through the whole process of connecting the whole set of complex apparatus step by step. At the beginning, the research did not proceed well. In the first three months, she recorded over 200 cells but no one was postsynaptic. She felt frustrate. Sometimes there wasn’t any progress in a week’s experiments, but Prof. Zhou never got impatient and upset. Instead, Zhou comforted her by praising her achievements in lab technology skills. The comfort turned into a kind of incentive for her to keep on adjusting experiment schemes and making breakthroughs. In the end, she succeeded, together with a cooperator, in publishing her graduation project result in the world’s best neuroscience academic periodical *Neuron*.

“Lujing does very well in scientific research, and she has a high academic morality,” Prof. Zhou said, “Her most important contribution is that she discovered a new retinal neural circuit and applied an analysis from the perspective of light genetics, electric physiology and pharmacology. Some of the critical verification was later done by a post-doctoral student, from whom Lujing learned some lab technology. For that reason, they made equal contribution to the paper, and they are co-authors.”

Zhiyuan’s unique cultivation mode encouraged Lujing to try, to make breakthroughs, to persevere in her effort, and to face challenges. Zhiyuan opened the gate to science.

Neuron  
Report



**An Unconventional Glutamatergic Circuit in the Retina Formed by vGluT3 Amacrine Cells**

Seunghoon Lee,<sup>1,4</sup> Lujing Chen,<sup>1,4,8</sup> Minggang Chen,<sup>1,4</sup> Meijun Ye,<sup>1</sup> Rebecca P. Seal,<sup>5</sup> and Z. Jimmy Zhou<sup>1,2,3,4,\*</sup>  
<sup>1</sup>Department of Ophthalmology and Visual Science  
<sup>2</sup>Department of Cellular and Molecular Physiology  
<sup>3</sup>Department of Neurobiology  
<sup>4</sup>Yale University School of Medicine, New Haven, CT 06510, USA  
<sup>5</sup>Zhiyuan College, Shanghai Jiao Tong University, Shanghai 200240, China  
<sup>6</sup>Department of Neurobiology, University of Pittsburgh School of Medicine, Pittsburgh, PA 15213, USA  
<sup>7</sup>Co-first author  
<sup>8</sup>Correspondence: jimmy.zhou@yale.edu  
<http://dx.doi.org/10.1016/j.neuron.2014.10.021>

**SUMMARY**

In the vertebrate retina, glutamate is traditionally thought to be released only by photoreceptors and bipolar cells to transmit visual signals radially along parallel ON and OFF channels. Lateral interactions in the inner retina are mediated by amacrine cells, which are thought to be inhibitory neurons. Here, we report calcium-dependent glutamate release from vGluT3-expressing amacrine cells (GACs) in the mouse retina.

GACs comprise a small subset (~1%) of ACs in the mammalian retina. They exhibit immunoreactivity for vGluT3 and glutamate, as well as glycine and glycine transporter GlyT1 (but not vesicular inhibitory amino acid transporter) (Haverkamp and Wässle, 2004; Johnson et al., 2004). They have a medium dendritic field and ramify diffusely between the ON and OFF cholinergic bands (Srinivas et al., 2011; Haverkamp and Wässle, 2004; Johnson et al., 2004), allowing them to interact potentially with both the ON and OFF channels. The possibility that GACs receive and release glutamate in both ON and OFF sublaminae of the IPL is fascinating, because it suggests an additional excit-



## Jiaqi Yin: Committed to a Beloved Career



Jiaqi Yin, a graduate of Mathematics from the class of 2015, Zhiyuan College, Shanghai Jiao Tong University, is currently pursuing her doctoral degree at Washington University, the United States.

Jiaqi was selected by Zhiyuan College from the College of Mechanism and Dynamic Engineering in her fresh year and admitted into the major of Life Science. Life Science is “based on Mathematics and Physics” which integrates knowledge of Mathematics, Physics, Biology and Chemistry. In the new community, Jiaqi met pioneering professors and motivated classmates. However, in the second year, she found that she couldn’t take any interest in biology and relevant experiments; she had no idea of what to do and what waits her in the future.

Wenjun Ying, one of the “Thousand Young Talents”, opened the gate to Mathematics for her. IN her third year, Jiaqi resumed her enthusiasm for studying Mathematics and tried to comprehend life with her Mathematics knowledge. With Prof. Ying’s guidance, she applied her knowledge to comprehending electrocardiogram mode, read academic papers on differential equation mode of cancer cell spreading, and self-learned programming. Her knowledge of biology helped her realize the limitation of differential equation reflected in complex life entity. The goal set, she confirmed her interest in Mathematics and planned to apply for Ph. D. in Computerized Biology. She also realized that she was interested in teaching. She was fortunate to obtain help from Prof. David Cai, a distinguished expert in the “Thousand Talents Program”. With Cai’s help, Jiaqi obtained an interview opportunity for the Mathematics direction at Zhiyuan. What an experience! Uniform continuity, uniform convergence, algorithm stability...during the one hour of interview, she performed excellent mathematical calculations and analysis on the writing board.



She succeeded in transferring to the direction of Mathematics on the condition that she had to stay for one more year in the college, which meant that she would graduate one year later than her former classmates, and that she would undergo much more pressure and hardship. But her strong desire for study and research made her agree to stay. She regarded a beloved career of creation was the best thing. God rewards the diligent. Jiaqi received an offer from Biometrics of Yale University and of Washington University, institutions with outstanding scientific potential and solid academic foundation. She made her choice in favor of Washington whose Biometrics ranked No. 1.

In her graduation speech in 2015, Jiaqi confessed, “Zhiyuan College offered us a chance to ‘make mistakes’ in addition to a lot of choices... Here, what you only need to do is perseverance, believe your ability to turn the impossible into a feasible plan and goal.” She used “choose Zhiyuan and love Zhiyuan” to imply her harvest at Zhiyuan College. Interest connected her with Zhiyuan; academic masters and congenial friends made her to love Zhiyuan.

Zhiyuan developed her dream and witnessed her growth.



## Zhuoyue Zhao: Indulging in the “Cradle of Scientists”



Zhuoyue Zhao, a graduate of Computer Science from the class of 2016, Zhiyuan College, Shanghai Jiao Tong University, is currently pursuing his doctoral degree at the University of Utah, the United States.

Zhuoyue Zhao has a distinct passion for science research. He attended Advance Data and Programming Technology (ADAPT) lab since his sophomore year. Under the supervision of Professor Qili Zhu, he studied Probability Programming Language, Bayesian Inference and its distributed systems implementation. In the early stage of his lab experience, he read a considerable number of relevant books and papers, further studied the theoretical basis of Bayesian Inference, Probabilistic Graphical Models, and added Metropolis-Hasting Sampling algorithm to the existing Single Probability Programming system in the ADAPT laboratory, so as to improve system performance. Since the beginning of 2015, they (Zhuoyue and his teammates) built the cooperation with Prof. Eric Lo from Hong Kong Polytechnic University to study how to design a Probability Programming framework based on the popular Distributed Computing engine, Apache Spark, for Bayesian inference for large-scale data. In his senior year, he went to Hong Kong Polytechnic University for internship. As a research assistant to Prof. Eric Lo, he achieved the InferSpark probability of programming framework based on Apache Spark. Their system can effectively utilize large clusters, process large-scale data for Bayesian Inference. They also jointly composed a thesis and submitted it to the top international conference (relevant to database), VLDB.

Working with Prof. Feifei Li from the University of Utah made him find the research direction that he was really interested in. In his junior year at Zhiyuan, Prof. Li was invited to Zhiyuan to give lecture on database system. The lecture helped him achieve a deeper understanding of and a keen interest in database system. He followed Prof. Li in studying Online Aggregation problems in the data field. Their joint research paper



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY

“Wander Join: Online Aggregation via Random Walks” was published at the database premier conference, SIGMOD2016, and was rewarded SIGMOND Best Paper Award. After graduation, he went to join Prof. Li at the University of Utah for his doctorate degree to continue databases research.

Maintaining his enthusiasm for science, benefiting from dedicated teachers, departing from Zhiyuan College, Zhuoyue is decidedly continuing his scientific research.