

Chin-Cheng CHAN

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RESEARCH INTERESTS

- Biomedical image processing with a focus on data-driven approaches
- Computational imaging with a focus on the joint design of imaging systems and image processing algorithms
- Inverse problems in image or signal processing

EDUCATION

SEPT. 2014 – JUN. 2018 | **National Taiwan University–Taipei, Taiwan**
Bachelor of Science in Electrical Engineering

- Cumulative GPA: 4.18/4.3; major GPA: 4.18/4.3; last-60 GPA: 4.25/4.3
- Ranking: 12/184 (top 6.5%)

RESEARCH EXPERIENCES

AUG. 2018 – PRESENT | **Full-time Research Assistant (with Prof. Homer H. Chen)–Taipei, Taiwan**
Multimedia Processing and Communications Lab, National Taiwan University

Project title: Deep Learning for Analysis of Optical Coherence Tomography (OCT) Images

- Demo: https://andrewccchan.github.io/research/dl_for_biomed/
- Reduced the detection error of the dermis-epidermis junction of human skin by 40%
- Achieved an 80% accuracy in automatic classification of skin cancer
- Collaborate interdisciplinarily with the Solid-state Laser Crystal and Device Laboratory, National Taiwan University

AUG. 2015 – JUL. 2018 | **Undergraduate Research Assistant (with Prof. Homer H. Chen)–Taipei, Taiwan**
Multimedia Processing and Communications Lab, National Taiwan University

Project title: Improving the Reliability of Phase-detection Autofocus (PDAF)

- Demo: <https://andrewccchan.github.io/research/pdaf/>
- Started from figuring out the principles of PDAF since very little technical information about PDAF was known from previous literature
- Mitigated the impact of the noise on phase correlation by applying a Gaussian filter. This work was published in IEEE International Conference on Image Processing (ICIP) 2017.
- Further improved the reliability of PDAF by modeling the noise of the phase information. This work was published in Electronic Imaging (EI) 2018.
- Achieved even better performance by reinforcement learning and published our work in EI 2019. This is one of the first data-driven approaches to autofocus and may serve as a foundation for future research.
- Mentored another undergraduate student on the autofocus team

Project title: Applications of the Robust Principal Component Analysis (RPCA)

- Demo: <https://andrewccchan.github.io/research/rpca/>
- Proposed the short-time RPCA algorithm for the extraction of blood vessels from OCT images
- Published our work in ICIP 2016 and IEEE Transactions on Medical Imaging

JUL. 2016 – AUG. 2016 | **Summer intern–Hsinchu, Taiwan**
Multimedia Department, MediaTek

- Gave an introductory talk on RPCA to the managers of the department
- Successfully designed a lane-detection algorithm for autonomous vehicles

PUBLICATIONS

- 2019 | **C. Chan** and H. H. Chen. "Autofocus by Deep Reinforcement Learning," accepted by *Electronic Imaging* 2019. [Link](#).
- 2018 | P. Lee, **C. Chan**, S. Huang, A. Chen and H. H. Chen, "Extracting Blood Vessels From Full-Field OCT Data of Human Skin by Short-Time RPCA," in *IEEE Transactions on Medical Imaging*, vol. 37, no. 8, pp. 1899-1909, Aug. 2018. [Link](#).
- 2018 | **C. Chan** and H. H. Chen, "Improving the Reliability of Phase Detection Autofocus," *Electronic Imaging*, vol. 2018, no. 5, pp. 1-5, 2018. [Link](#).
- 2017 | **C. Chan**, S. Huang and H. H. Chen, "Enhancement of phase detection for autofocus," *2017 IEEE International Conference on Image Processing (ICIP)*, Beijing, 2017, pp. 41-45. [Link](#).
- 2016 | P. Lee, **C. Chan**, S. Huang, A. Chen and H. H. Chen, "Blood vessel extraction from OCT data by short-time RPCA," *2016 IEEE International Conference on Image Processing (ICIP)*, Phoenix, AZ, 2016, pp. 394-398. [Link](#).

AWARDS

- SEP. 2017 | **Travel grant for attending ICIP 2017**
- Funded by the department of electrical engineering, National Taiwan University
- JAN. 2017 | **4st place in the final project contest of the Machine Learning course**
- Trained classifiers for detecting cyberattacks
 - Greatly improved the accuracy by replacing a fully-connected neural network with a random forest
- JAN. 2016 | **1st place in the final project contest of the Data Structure and Programming course**
- Designed algorithms for circuit (and-inverter graph) optimization
 - Achieved significant improvement in performance by replacing depth first search with breadth first search in the gate-merging algorithm
 - The only program that outperformed the teacher's reference program
- DEC. 2014 | **Committee's award in MEI-CHU Hackathon**
- Designed an algorithm for predicting the usage pattern of air conditioners in smart homes

SELECTED COURSES TAKEN (ALL A+)

Mathematics	Linear Algebra I&II (department of mathematics) and Advanced Statistics I&II [†]
Signal processing	Advanced Digital Signal Processing [†] , Digital Speech Processing, and Principle of Communications
Machine learning	Machine Learning and Having It Deep and Structured [†] (Applied Deep Learning), Machine Learning [†] , and Special Topics in data Analytics and Modeling [†]

[†] denotes graduate-level courses

TEST SCORES

GRE Verbal: 158; quantitative: 170; analytical writing: 3.5
TOEFL Reading: 30; listening: 29; speaking: 24; writing: 25

VOLUNTARY WORK

- SEP. 2016 – JUN. 2017 | **Teaching assistant and website manager of the Green Tree club (weekly voluntary tutoring service for disadvantaged junior high school students)—Taipei, Taiwan**
- Trained new volunteers for tutoring services
 - Rebuilt a website that allows volunteers to exchange their tutoring experiences
 - Participated in weekly tutoring services from 2015 to 2018