# Brian Chen

*APPLYING FOR GRADUATE SCHOOL*

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## Education

### University of Illinios at Urbana Champaign (UIUC)
*Illinois, USA*

B.S. IN COMPUTER SCIENCE
*Aug. 2018 - Present*

- GPA: 3.90/4.00, **Technical GPA: 3.96/4.00**, Expected Graduation Date: Dec. 2021

### National Taiwan University (NTU)
*Taipei, Taiwan*

VISITING STUDENT IN COMPUTER SCIENCE AND INFORMATION ENGINEERING
*Sep. 2020 - Jan. 2021*

- Fall 2020, one semester visiting student
- GPA: 4.3/4.3

## Experiences

### Robotics Institute Summer Scholar (RISS)
*Pennsylvania, USA*

ILLUMINATION AND IMAGING LAB, RI@CMU, SUPERVISED BY PROF. SRINIVASA NARASIMHAN
*Jun. 2021 - Present*

- Introduced a novel construction zone dataset by efficiently collecting images through Google search engine and in real world
- Developed a model trained on our dataset to classify construction zone and integrate this model to larger camera systems such as bus camera
- Experimented on utilizing segmentation masks from pretrained models to improve the performance

### Undergradute Research Assistant
*Taipei, Taiwan*

VISION & LEARNING LAB, SUPERVISED BY PROF. YU-CHIANG FRANK WANG
*Sep. 2020 - Jan. 2021*

- Worked on unsupervised learning for 3D representation learning of different types of representation such as meshes and point cloud
- Conducted 3D mesh data augmentation to improve performance of representation learning

### Deep Learning Research Intern
*Illinois, USA*

DATA ANALYTICS GROUP, NATIONAL CENTER OF SUPERCOMPUTING APPLICATION (NCSA)
*Jun. 2020 - May 2021*

- Data preprocessing for videos with cv2, pandas
- Built a temporal convolutional network with transfer learning for **action recognition** of wildlife animals, by tensorflow and keras
- Worked on a real-world sea turtle dataset and achieve **98% frame-wise accuracy** @ 1 fps
- Familiar with Linux system, cluster job scripts, distributed learning
- Communicated with researchers in biology and met their needs

### Undergraduate Research Assistant
*Illinois, USA*

CV LAB, SUPERVISED BY PROF. DAVID FORSYTH
*Feb. 2020 - Present*

- Utilized differentiable soft rasterizers and mesh representation to improve the inference time of **semantic segmentation**
- Implemented a customized subdivision method for higher accuracy at boundaries of semantic masks
- Experienced with PASCAL VOC, COCO dataset

### PyTorchFI Contributor
*Illinois, USA*

HACKILLINOIS
*Feb. 2020*

- Developed a runtime perturbation tool (PyTorchFI) for DNNs, implemented for PyTorch
- Refactored the fault injector that was originally only for CNN so that it can inject error into specific parts of RNNs and LSTMs for testing models' robustness to unexpected errors

## Projects

### Video Frame-wise Compression Through Contrastive Loss
*Illinois, USA*

COMPUTATIONAL PHOTOGRAPHY COURSE TEAM PROJECT
*Mar. 2021 - May 2021*

- Introduced a novel model paradigm for training a model to automatically compress videos by extracting key frames in videos
- Allowed the model to be added on any existing video classification models, without requiring any additional labels, trained with contrastive loss
- Developed a linear-weighted key frames selection operation to bypass the non-differentiable issue of index-operation

### Generate Human Face Sketches
*Illinois, USA*

Computational Photography Course Team Project
*Nov. 2019 - Dec. 2019*

- Generated human face sketch from actual human face photo using GAN
- Produced pencil human face sketch by randomly drawing curves based on specified criteria with K-means method to improve the quality

### UIUC International Students Population Visualization
*Illinois, USA*

Data Science and Visualization Course Project
*Apr. 2019*

- Created a pie chart for international students population at UIUC from 1992 to 2018 using html and D3.js
- Dynamic size and color of pie chart to indicates the total enrollments and sex ratio, respectively

## **Hon**ors & Awards

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|---|---|---|
| 2021 | **National Science Foundation(NSF), Research Experiences for Undergraduates (REU)**, NSF | *Pennsylvania,, USA* |
| 2020 | **NCSA Fiddler Innovation Undergraduate Student Fellowship Award**, Illinois Emerging Digital Research and Education in Arts Media (eDream) Institute | *Illinois, USA* |
| '18-'20 | **College of Engineering Dean's List**, Grainger College of Engineering, UIUC | *Illinois, USA* |

## **Pre**sentation

### NCSA Undergraduate Research Symposium
*Illinois, USA*

Presenter for AI System in Identification of Wildlife Animals
*Jul. 2020*

- Introduced the application of deep learning to video analysis in other fields
- Introduced how deep learning and computer vision model solved and answered the biological question

## **Tea**ching

### Machine Learning
*Illinois, USA*

Course Assistant
*Sep. 2020 - Dec. 2020*

- Designed and developed the final project topic for the course
- Responsible for building baseline model and setting up Kaggle competition

## **Rel**evant Courses

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|---|---|
| **UIUC** | Machine Learning, Applied Machine Learning, Computational Photography, Introduction to Algorithms & Models of Computation, System Programming, Database System, **Advanced Computer Vision (grad. level)**, **AI and Computer Graphics (grad. level)** |
| **NTU** | Deep Learning in Computer Vision, Distributed Machine Learning System, Privacy and Security of Machine Learning |

## **Ski**lls

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|---|---|
| **Programming** | Python, JAVA, C++, C, LaTeX |
| **Libraries/Packages** | PyTorch, OpenCV, Pytorch3D, Keras, TensorFlow |
| **Machine Learning** | optimization, CNN, DNN, RNN, LSTM, GAN, VAE, GMM, EM, HMM, RL, Q-Learning |
| **Languages** | English, Mandarin, Japanese |