Nan-Chen Chen

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Research Interests

My research focuses on human-computer interaction and visualization. I am particularly excited about building visualization for complex artificial intelligence (AI) systems and machine learning (ML) models. Specially, I work on interactive visualization and visual analytics for AI/ML developers to explore and understand data in AI/ML development workflows for finding directions for further improvement.

Education

2013 – Present **Ph.D. in Human Centered Design & Engineering, University of Washington**
Advisor: Prof. Cecilia R. Aragon
Committee members:
Dr. Been Kim (Google & UW CSE), Prof. Andrew J. Ko (UW iSchool), Prof. Gary Hsieh (UW HCDE)

2008 – 2013 **B.S. in Computer Science and Information Engineering, National Taiwan University**
Minor in Psychology
Advisor: Prof. Hao-Hua Chu

Awards & Honors

2016 **Intern of the Year, Allen Institute for Artificial Intelligence (AI2)**
Only one recipient per year

2014 **Microsoft Research Graduate Women's Scholarship, Microsoft Research (MSR)**
Recognizes outstanding 1st year female PhD students

2011 **Google Anita Borg Memorial Scholarship, Google, Inc.**
Recognizes female engineers with excellent academic performance and strong leadership skills

2011 – Present **Hsing Tian Kong Long-Term Fellowship for Cultivating Elite Students, Hsing Tian Kong Temple**
Fellowship to support elite students with acceptance rate of 0.1%

2011, 2012 **Irving T. Ho Memorial Scholarship, Irving T. Ho Memorial Foundation**
Recognizes undergraduate in EECS with excellent academic performance (3 recipients a year)

2008 – 2012 **Presidential Award, National Taiwan University**
Recognizes top 5% students in the Department of Computer Science and Information Engineering
(Received 5 times: Fall 2008, Spring 2009, Fall 2009, Fall 2011, Spring 2012)

2009 **Ninth Place Award, ACM International Collegiate Programming Contest, Asia Regional**
Ninth place out of 45 teams from various Asian countries

Publications

——— Conference Papers

2019 **Harnessing Complexity in High Performance Computing Ecosystems: A Complex Adaptive Systems Framework**
Nan-Chen Chen, Lavanya Ramakrishnan, Sarah S. Poon, Cecilia R. Aragon
HICSS'19: Hawaii International Conference on System Sciences, Managing Platforms and Ecosystems Minitrack [pdf]

2018 **AnchorViz: Facilitating Classifier Error Discovery through Interactive Semantic Data Exploration**
Nan-Chen Chen, Jina Suh, Johan Verwey, Gonzalo Ramos, Steven Drucker, and Patrice Simard
IUI'18: ACM International Conference on Intelligent User Interfaces [pdf]

2018 **Grounding Interactive Machine Learning Tool Design in How Non-Experts Actually Build Models**
Qian Yang, Jina Suh, *Nan-Chen Chen*, Gonzalo Ramos
DIS'18: ACM SIGCHI Conference on Designing Interactive Systems [pdf]

2017 **QSAnglyzer: Visual Analytics for Prismatic Analysis of Question Answering System Evaluations**
Nan-Chen Chen, Been Kim
VAST'17: IEEE Conference on Visual Analytics Science and Technology [pdf]

2017 **SparQs: Visual Analytics for Sparking Creativity in Social Media Exploration**
Nan-Chen Chen, Michael Brooks, Rafal Kocielnik, Sungsoo (Ray) Hong, Jeff Smith, Sanny Lin, Zening Qu, and Cecilia Aragon
HCI International'17: International Conference on Human-Computer Interaction [pdf]

2017 **Aeonium: Visual Analytics to Support Collaborative Qualitative Coding**
Margaret Drouhard, *Nan-Chen Chen*, Jina Suh, Rafal Kocielnik, Vanessa Pena-Araya, Keting Cen, Xiangyi Zheng, and Cecilia R. Aragon
PacificVis '17: IEEE Pacific Visualization Symposium [pdf]

2017 **Lariat: A Visual Analytics Tool for Social Media Researchers to Explore Twitter Datasets**
Nan-Chen Chen, Michael Brooks, Rafal Kocielnik, Ray Hong, Zening Qu, Jeff Smith, Sanny Lin, Cecilia Aragon
HICSS'17: Hawaii International Conference on System Sciences, Data Analytics and Data Mining for Social Media Minitrack [pdf]

2016 **Considering Time in Designing Large-Scale Systems for Scientific Computing**
Nan-Chen Chen, Sarah S. Poon, Lavanya Ramakrishnan, Cecilia R. Aragon
CSCW'16: ACM Conference on Computer-Supported Cooperative Work and Social Computing [pdf]

2014 **Thermalprobe: Exploring the use of thermal identification for per-user energy metering**
Chuang-Wen You, Hsin-Liu Kao, Bo-Jhang Ho, *Nan-Chen Chen*, Yi-Hsuan Hsieh, Polly Huang, Hao-Hua Chu

GreenCom'14: IEEE International Conference on Green Computing and Communications [**Best Paper Award**] [pdf]

2011 **HeatProbe: a thermal-based power meter for accounting disaggregated electricity usage**
Bo-Jhang Ho, Hsin-Liu Kao, *Nan-Chen Chen*, Chuang-Wen You, Hao-Hua Chu, and Ming-Syan Chen
Ubicomp'11: ACM International Conference on Ubiquitous Computing [pdf]

——— Journal Papers

2018 **Using Machine Learning to Support Qualitative Coding in Social Science: Shifting The Focus to Ambiguity**
Nan-Chen Chen, Margaret Drouhard, Rafal Kocielnik, Jina Suh, Cecilia R. Aragon
ACM TiiS Special on Human Centered Machine Learning [pdf]

2017 **Emoticons in Informal Text Communication: A New Window on Bilingual Alignment**
Laurie Beth Feldman, Cecilia R. Aragon, *Nan-Chen Chen*, and Judith F. Kroll
Bilingualism: Language and Cognition (Vol 21, Issue 1)

2017 **Toward the Operationalization of Visual Metaphor**
Alexis Hiniker, Sungsoo (Ray) Hong, Yeaseul Kim, *Nan-Chen Chen*, Jevin West, Cecilia Aragon
JASIST: Journal of the Association for Information Science and Technology

——— Workshop Papers & Conference Posters

2016 **Challenges of Applying Machine Learning to Qualitative Coding**
Nan-Chen Chen, Rafal Kocielnik, Margaret Drouhard, Vanessa Peña-Araya, Jina Suh, Keting Cen, Xiangyi Zheng and Cecilia R. Aragon
HCML'16: CHI 16 Workshop on Human Centered Machine Learning [pdf]

2014 **Emoticons and Linguistic Alignment: How Visual Analytics Can Elicit Storytelling**
Nan-Chen Chen, Laurie Beth Feldman, Judith F. Kroll, Cecilia R. Aragon
VIS'14: IEEE Conference on Visualization [pdf]

2014 **Establishing common ground in informal text communication: Emoticon use in first and second languages**
Nan-Chen Chen, Laurie Beth Feldman, Judith F. Kroll, Cecilia R. Aragon
Conference on Finding Common Ground: Social, Ecological, and Cognitive Perspectives on Language Use [pdf]

2014 **Emoticon and Text Production in First and Second Languages in Informal Text Communication**
Cecilia R. Aragon, *Nan-Chen Chen*, Judith F. Kroll, Laurie Beth Feldman
SBP'14: International Social Computing, Behavioral Modeling and Prediction Conference [pdf]

2012 **Listen-to-nose: a low-cost system to record nasal symptoms in daily life**
Nan-Chen Chen, Kuo-Cheng Wang, and Hao-Hua Chu

Ubicomp'12: ACM International Conference on Ubiquitous Computing [pdf]

2011 **HeatProbe: a thermal-based power meter System for tracking per-user power consumption**

Nan-Chen Chen, Bo-Jhang Ho, Hsin-Liu Kao, Chuang-Wen You, Hao-Hua Chu, and Ming-Syan Chen

Pervasive'11: International Conference on Pervasive Computing [pdf]

Research Experience & Internships

Summer 2018 **Research Intern, Microsoft Research (MSR)**

Supervisor: Gonzalo Ramos, Machine Teaching Group

Modify sensemaking loop theory (Pirolli & Card 2005) to come up with design requirement for interactive machine learning and use these requirements to design an interface. The interface is implemented in TypeScript, and the backend is in Python.

Summer 2017 **Research Intern, Microsoft Research (MSR)**

Supervisor: Jina Suh, Machine Teaching Group

Designed and built an interactive visualization tool called *AnchorViz* for discovering classifier errors in interactive machine learning. The interface design has been adapted into Microsoft's machine learning tool and has been filed a pattern. The interface is implemented in TypeScript with React.js & D3.js; the backend of the system is implemented in C#.

Summer & Autumn 2016 **PhD Intern, Allen Institute for Artificial Intelligence (AI2)**

Supervisor: Dr. Been Kim

Used human-centered design process to design and build a visual analytics tool called *QSAnglyzer* for Question Answering System developers at AI2. The system has been well-received by the target users and adopted into their workflows. I received the Intern-of-the-Year award for this work.

Summer 2015 **PhD Intern, Pacific Northwest National Laboratory (PNNL)**

Supervisors: Erin Fitzhenry, Dr. George Jr. Chin

Used human-centered design process to build a visual analytics tool for comparative analysis on power grid simulation outputs

2014 – 2017 **Research Assistant, Human-centered Data Science Lab, University of Washington**

Supervisor: Prof. Cecilia R. Aragon

Applying ethnography to study scientific workflows in high-performance computing

2010 – 2013 **Research Assistant, Ubiquitous Computing Lab, National Taiwan University**

Supervisor: Prof. Hao-Hua Chu

Worked on sensing in energy and health related topics

2009 – 2013 **Programming Research Assistant, National Taiwan University**

Supervisor: Prof. Zhao-Ming Gao

Wrote programs for computational linguistics projects

Service and Extracurricular Experience

2017– 2018 **Teaching Assistant, University of Washington**

- Evaluation Studio (HCID 531), Spring 2018
- Computational Concepts in HCDE (HCDE 530), Winter 2018
- Interactive Systems Design and Technology (HCDE 310), Autumn 2017

2012, 2016, 2017 **Student Volunteer (Ubicomp 2012 / CSCW 2016 / SIGCSE2017 / VIS 2017)**
Helped prepare the conference and assisted session chairs with logistics

2012 – 2013 **Teaching Assistant, National Taiwan University**

- Introduction to Computer Programming (CSIE1921), Spring 2013
- Introduction to Computer Programming (CSIE1210), Fall 2012
- Algorithm Design and Analysis (CSIE2136), Fall 2012

2013 **Founder and Chief Organizer of NTU CSIE Sprout Training Program, National Taiwan University**
Offered training courses to senior high school students around Taiwan to advance programming and problem-solving skills. (official website: http://www.csie.ntu.edu.tw/~sprout)

Fall 2009 **Member of the Training Program for ACM International Collegiate Programming Contest (ACM/ICPC), National Taiwan University**
Trained as contestants for ACM/ICPC contests

2008 – 2013 **Informatics Contest Coach, Taipei First Girls' Senior High School**
Coached contestants for International Olympiad in Informatics

Fall 2010 **President, National Taiwan University Toastmasters Club**
Helped members cultivate leadership and communication skills

Proficiency and Other Experience

——— Skills

- Programming Languages:
  C & C++ languages, JavaScript (experienced in native JS & frameworks like Angular.js, React.js, Node.js and Backbone.js, and visualization libraries like D3.js), Python (both native Python & Django framework), TypeScript, Perl, Java, PHP, MySQL/PostgreSQL, HTML/CSS
- User Experience Design & Research:
  Observations, Interviews, Ethnography, Formative Studies, Participatory Design, Wireframes & Prototyping, Visual Design (Photoshop & Illustrator), Experiment Design, Qualitative Evaluation, Statistics, Qualitative Analysis
- HCI Specialization: Visualization / Visual Analytics

——— Languages

- English (fluent), Mandarin Chinese (native), Japanese (JLPT N3 passed)
- Four-year membership in Toastmasters International Club, an international club that cultivates public speaking skills

——— Teaching

- More than 6 years of experience teaching C/C++ languages to over 100 female students.
- Experienced in teaching data structures and algorithms (see course materials at http://nanchen.csie.org)