Chen Song

CONTACT INFORMATION	340 Davis Hall Department of Computer Science & Engineering University at Buffalo, SUNY Buffalo, NY 14260-2500 USA	*Phone:* (217) 550-2544 *E-mail:* csong5@buffalo.edu *Page:* http://cse.buffalo.edu/~csong5/

RESEARCH INTERESTS

Cyber-Physical Security, Smart and Mobile Health, Emerging Biometrics.

RELATED RESEARCH AREAS

Embedding Sensor System, Mobile Computer, Data Analytics, Human-Computer Interaction.

EDUCATION

University at Buffalo, the State University of New York (SUNY), New York

Ph.D., Computer Science & Engineering, Aug. 2014 - Present

University at Buffalo, the State University of New York (SUNY), New York

M.S., Electrical Engineering, Sep. 2012 - May. 2014

Fudan University, Shanghai, China

B.S., Optic Science & Engineering, Jun. 2006 - Jul. 2010

AWARDS AND HONORS

A5. Best Demo Award, The 19th International Workshop on Mobile Computing Systems and Applications (HotMobile), 2018

A4. Best Graduate Research Award, Computer Science & Engineering, University at Buffalo (SUNY), 2018

A3. Best Paper Award, IEEE International Conference on Biomedical and Health Informatics (BHI), 2017

A2. Student Travel Award, ACM Conference on Computer and Communications Security (CCS), 2016

A1. Student Travel Award, ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp), 2014

SELECTED PUBLICATIONS

S6. Feng Lin, Kun Woo Cho, **Chen Song**, Zhanpeng Jin, Wenyao Xu, "*Exploring A Secure and Truly Cancelable Brain Biometrics for Smart Headwear*", The 16th ACM International Conference on Mobile Systems, Applications, and Services (**MobiSys'18**), Munich, German, June 2018 (*Acceptance Rate: 26.81%, 37 out of 138*)

S5. **Chen Song**, Feng Lin, Yan Zhuang, Wenyao Xu, Changzhi Li, Kui Ren, "*Cardiac Scan: A Non-Contact and Continuous Heart-Based User Authentication System*", ACM Annual International Conference on Mobile Computing and Networking (**MobiCom'17**), Snowbrid, Utah, October 2017 (*Acceptance Rate: 18.8%, 35 out of 186*)

S4. **Chen Song**, Aosen Wang, Feng Lin, Ruogang Zhao, Zhanpeng Jin, Wenyao Xu, "*A Tempo-spatial Compressed Sensing Architecture for Efficient High-throughput Information Acquisition in Organs-on-a-chip*", IEEE International Conference on Biomedical and Health Informatics (**BHI'17**), Orlando, Florida, February 2017 (*Best Paper Award: 0.3%, 1 out of 322*)

S3. Jerry Ajay, **Chen Song**, Aditya Singh Rathore, Chi Zhou, Wenyao Xu, "*Instruction Level Power Analysis and Optimization of 3D Printers*", ACM International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS'17**), Xi'an, China, April 2017 (*Acceptance Rate: 17.4%, 56 out of 321*)

S2. **Chen Song**, Feng Lin, Zongjie Ba, Kui Ren, Chi Zhou, Wenyao Xu, "*My Smartphone Knows What You Print: Exploring Smartphone-based Side-channel Attacks Against 3D Printers*", ACM Conference on Computer and Communications Security (**CCS'16**), Vienna, Austria, October 2016 (*Acceptance Rate: 16.4%, 137 out of 831*)

S1. **Chen Song**, Aosen Wang, Kui Ren, Wenyao Xu, "*EyeVeri: A Secure and Usable Approach for Smartphone User Authentication*", IEEE International Conference on Computer Communications (**INFOCOM'16**), San Francisco, California, April 2016 (*Acceptance Rate: 18.2%, 300 out of 1644*)

CONFERENCE PUBLICATIONS

C24. Feng Lin, Kun Woo Cho, **Chen Song**, Zhanpeng Jin, Wenyao Xu, "*Exploring A Secure and Truly Cancelable Brain Biometrics for Smart Headwear*", The 16th ACM International Conference on Mobile Systems, Applications, and Services (**MobiSys'18**), Munich, German, June 2018

C23. Jerry Ajay, **Chen Song**, Aosen Wang, Jeanne Langan, Zhinan Li, Wenyao Xu, "*A Pervasive and Sensor-Free Deep Learning System for Parkinsonian Gait Analysis*", IEEE Annual International Conference on Biomedical and Health Informatics (**BHI'18**), Las Vegas, Nevada, March 2018

C22. Zhengxiong Li, Michael Brown, Junqi Wu, **Chen Song**, Feng Lin, Jeanne Langan, Wenyao Xu "*Development and Evaluation of a Multimodal Sensor Motor Learning Assessment*", IEEE Annual International Conference on Wearable and Implantable Body Sensor Networks (**BSN'18**), Las Vegas, Nevada, March 2018

C21. Tri Vu, Hoan Tran, **Chen Song**, Feng Lin, Jeanne Langan, Lora Cavuoto, Wenyao Xu, "*BiGRA: A Preliminary Bilateral Hand Grip Coordination Rehabilitation Using Home-Based Evaluation System for Stroke Patients*", IEEE Annual International Conference on Wearable and Implantable Body Sensor Networks (**BSN'18**), Las Vegas, Nevada, March 2018

C20. Zhisheng Yan, **Chen Song**, Feng Lin, Wenyao Xu, "*Exploring Eye Adaptation in Head-Mounted Display for Energy Efficient Smartphone Virtual Reality*", ACM International Workshop on Mobile Computing Systems and Applications (**HotMobile'18**), Tempe, Arizona, February 2018

C19. **Chen Song**, Feng Lin, Yan Zhuang, Wenyao Xu, Changzhi Li, Kui Ren, "*Cardiac Scan: A Non-Contact and Continuous Heart-Based User Authentication System*", ACM Annual International Conference on Mobile Computing and Networking (**MobiCom'17**), Snowbrid, Utah, October 2017

C18. Jerry Ajay, **Chen Song**, Aditya Singh Rathore, Chi Zhou, Wenyao Xu, "*Instruction Level Power Analysis and Optimization of 3D Printers*", ACM International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS'17**), Xi'an, China, April 2017

C17. Zhuolin Yang, **Chen Song**, Feng Lin, Jeanne Langan, Wenyao Xu, "*Empowering A Gait Feature-Rich Timed-Up-and-Go System for Complex Ecological Environments*", ACM/IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies (**CHASE'17**), Philadelphia, USA, July 2017

C16. Tri Vu, Hoan Tran, Kun Woo Cho, **Chen Song**, Feng Lin, Michelle Hartley-McAndrew, Kathy Doody, Chang Wen Chen, Wenyao Xu, "*Efficient and Effective Visual Stimuli Design for Quantitative Autism Screening: An Exploratory Stud*", IEEE International Conference on Biomedical and Health Informatics (**BHI'17**), Orlando, Florida, February 2017

C15. **Chen Song**, Aosen Wang, Feng Lin, Ruogang Zhao, Zhanpeng Jin, Wenyao Xu, "*A Tempo-spatial Compressed Sensing Architecture for Efficient High-throughput Information Acquisition in Organs-on-a-chip*", IEEE International Conference on Biomedical and Health Informatics (**BHI'17**), Orlando, Florida, February 2017

C14. **Chen Song**, Feng Lin, Zongjie Ba, Kui Ren, Chi Zhou, Wenyao Xu, "*My Smartphone Knows What You Print: Exploring Smartphone-based Side-channel Attacks Against 3D Printers*", ACM Conference on Computer and Communications Security (**CCS'16**), Vienna, Austria, October 2016

C13. Kun Woo Cho, Feng Lin, **Chen Song**, Xiaowei Xu, Michelle Hartley-McAndrew, Kathy Doody, Wenyao Xu, "*Gaze-Wasserstein: Exploring A Quantitative Screening Approach to Autism Spectrum Disorder*", IEEE Annual Wireless Health Conference (**WH'16**), Washington D.C., October, 2016

C12. Jerry Ajay, Aditya Singh Rathore, **Chen Song**, Chi Zhou, Wenyao Xu, "*Don't Forget Your Electricity Bills! An Empirical Study of Characterizing Energy Consumption of 3D Printers*", ACM Asia-Pacific Workshop on Systems (**APSys'16**), Hong Kong, China, August 2016

C11. Feng Lin, **Chen Song**, Xiaowei Xu, Lora Cavuoto, Wenyao Xu, "*Patient Handling Activity Recognition Approach Through Pressure-Map Manifold Learning Using Smart Insole*", IEEE 1st International Conference on Connected Health: Applications, Systems and Engineering Technologies (**CHASE'16**), Washington D.C., June 2016

C10. **Chen Song**, Aosen Wang, Kui Ren, Wenyao Xu, "*EyeVeri: A Secure and Usable Approach for Smartphone User Authentication*", IEEE International Conference on Computer Communications (**INFOCOM'16**), San Francisco, California, April 2016

C9. Kun Woo Cho, Feng Lin, **Chen Song**, Xiaowei Xu, Fuxing Gu, Wenyao Xu, "*Thermal Handprint Analysis for Forensic Identification using Heat-Earth Mover's Distance*", IEEE International Conference on Identity, Security and Behavior Analysis (**ISBA'16**), Sendai, Japan, February 2016

C8. **Chen Song**, Aosen Wang, Kathy Doody, Michelle Hartley-McAndrew, Jana Mertz, Wenyao Xu, "*Analyzing Dynamic Components of Social Scene Parsing Strategy in Autism Spectrum Disorder*", IEEE International Conference on Biomedical and Health Informatics (**BHI'16**), Las Vegas, California, January 2016

C7. Yan Zhuang, **Chen Song**, Feng Lin, Yiran Li, Changzhi Li, Wenyao Xu, "*On the Feasibility of Non-contact Cardiac Motion Sensing for Emerging Heart-based Biometrics*", IEEE Radio and Wireless Symposium (**RWS'16**), Austin, Texas, January 2016

C6. Feng Lin, Aosen Wang, **Chen Song**, Wenyao Xu, Zhinan Li, Qin Li, "*A Comparative Study of Smart Insole on Real-World Step Count*", IEEE Signal Processing in Medicine and Biology Symposium (**SPMB'15**), Philadelphia, Pennsylvania, December 2015

C5. Xiaowei Xu, Feng Lin, Aosen Wang, **Chen Song**, Yu Hu, Wenyao Xu, "*On-bed Sleep Posture Recognition Based on Body-Earth Mover's Distance*", IEEE Conference on Circuits and Systems (**BioCAS'15**), Atlanta, Georgia, October 2015

C4. Aosen Wang, **Chen Song**, Xiaowei Xu, Feng Lin, Zhanpeng Jin, Wenyao Xu, "*Selective and Compressed Sensing for Energy-Efficient Implantable Neural Encoding*", IEEE Conference on Circuits and Systems (**BioCAS'15**), Atlanta, Georgia, October 2015

C3. Yan Zhuang, **Chen Song**, Aosen Wang, Feng Lin, Yiran Li, Changzhan Gu, Changzhi Li, Wenyao Xu, "*SleepSense: Non-invasive Sleep Event Recognition Using An Electromagnetic Probe*", IEEE International Conference on Implantable and Wearable Body Sensor Networks Conference (**BSN'15**), MIT, Cambridge, June 2015

C2. Aosen Wang, **Chen Song**, Zhanpeng Jin, Wenyao Xu, "*Adaptive Compressed Sensing Architecture in Wireless Brain Computer Interface*", ACM/IEEE Design Automation Conference (**DAC'15**), San Francisco, California, June 2015

C1. Aosen Wang, **Chen Song**, Wenyao Xu, "*A Configurable Quantized Compressed Sensing Architecture for Low-Power Tele-Monitoring*", International Green Computing Conference (**IGCC'14**), Dallas, Texas, November 2014

JOURNAL PUBLICATIONS	J6. **Chen Song**, Aosen Wang, Feng Lin, Jian Xiao, Wenyao Xu, "*Selective CS: Energy-Efficient Sensing Architecture for Wireless Implantable Neural Decoding*", IEEE Journal on Emerging and Selected Topics in Circuits and Systems (**JETCAS'18**)

J5. **Chen Song**, Aosen Wang, Feng Lin, Ruogang Zhao, Zhanpeng Jin, Jian Xiao, Wenyao Xu, "*Tempo-Spatial Compressed Sensing of Organ-on-a-chip for Pervasive Health*", The Journal of Biomedical and Health Informatics (**JBHI'17**)

J4. Feng Lin, **Chen Song**, Xiaowei Xu, Lora Cavuoto, Wenyao Xu, "*Patient handling activity recognition through pressure-map manifold learning using a footwear sensor*", The Elsevier Smart Health (**SH'16**)

J3. **Chen Song**, Aosen Wang, Kathy Ralabate Doody, Michelle Hartley-McAndrew, Jana Mertz, Feng Lin, Wenyao Xu, "*A Comparative Study of Social Scene Parsing Strategies between Children with and without Autism Spectrum Disorder*", The North American Journal of Medical Sciences (**NAJMS'16**)

J2. Yin Bi, Mingsong Lv, **Chen Song**, Wenyao Xu, Guan Nan, Wang Yi, "*AutoDietary: A Wearable Acoustic Sensor System for Food Intake Recognition in Daily Life*", IEEE Sensors Journal (**SJ'16**)

J1. Feng Lin, Yan Zhuang, **Chen Song**, Aosen Wang, Yiran Li, Changzhan Gu, Changzhi Li, Wenyao Xu, "*SleepSense: a Noncontact and Cost-effective Sleep Monitoring System*", IEEE Transactions on Biomedical Circuits and Systems (**TBioCAS'15**)

GRANT EXPERIENCE

G2. **Significant contributor, National Science Foundation (NSF), CNS-1718375, , $500K**, 2017/09/01 - 2020/08/31
Project Title: "*SaTC: CORE: Small: Collaborative: Cardiac Password: Exploring A Non-Contact and Continuous Approach to Secure User Authentication*".

G1. **Co-writer, National Institute of Health (NIH), NICHD, 01R21EB024731, $425,166**, 2017/07/01 - 2019/06/30
Project Title: "*A Functional Upper Limb Training and Assessment Tool to Enhance Efficacy and Scalability of Rehabilitation in Ecological Environments*".

INVITED TALKS

T2. "*Eye-based User Authentication in Mobile Smartphones*", University at Buffalo SUNY, Buffalo, New York, May 2017

T1. "*Machine Learning and Inclusive Design*", OCAD University, Toronto, Ontario, April 2017

MEDIA COVERAGE

- Research work on "Cardiac scan: a non-contact heart based biometric system" [C19] is reported by **100** public media outlets, including *Hacker News*, *National Science Foundation's news* and *Communication of the ACM*, October 2017.

- Research work on "Smartphone app for early autism detection" [C8, C13] is increasingly reported by public media outlets, including *Eurekalert*, *HealthNewsDigest* and *UB News Center*, November 2016.

- Research work on "Smartphone hacks 3D Printers" [C14] is reported by more than **80** public media outlets, including *NSF Science'360*, *National Science Foundation's News*, *Communications of the ACM news*, *Science Daily*, *Digital Trend*, *Fedscoop*, and *3DPrint*, October 2016

- Research work on "Smart Necklace for Food-intake Monitoring" [J2] is reported by more than **50** public media outlets, including *UB News Center*, *The Wall Street Journal*, *National Public Radio's News*, *Science Daily*, *Sohu.com* and *IEEE Spectrum*, March 2016

Conference Reviewer:
- IEEE International Conference on Computer Communications (INFOCOM), 2016, 2017, 2018
- International Conference on Security, Privacy and Anonymity in Computation, Communication and Storage (SPACCS), 2017
- IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE), 2016
- IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC), 2016
- EAI International Conference on Body Area Networks (BodyNets), 2016
- The ACM SIGBED International Conference on Embedded Software (EMSOFT), 2016
- IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2015

Journal Reviewer:
- Elsevier Journal of Information Security and Applications (JISA), 2017
- IEEE Transactions on Vehicular Technology (TVT),2017
- Proceedings of the ACM on Interactive, Multimedia, Wearable and Ubiquitous Technologies (IMWUT), 2017
- Medical Physics (MS), 2017
- Elsevier Computer Methods and Programs in Biomedicine (CMPB), 2016, 2017
- Springer Journal of Network and Systems Management (JONS), 2016
- IEEE Transactions on Mobile Computing (TMC), 2016
- IEEE Transactions on Information Forensics and Security (TIFS), 2016

PH.D Students:
- Jerry Ajar, January 2016 - present
- Zhengxiong Li, August 2016 - present
- Hanbing Zhang, August 2017 - present

Master Students:
- Aditya Singh Rathore, January 2016 - present (now PH.D at SUNY University at Buffalo)
- Yan Zhuang, October 2014 - May 2015 (now PH.D at University of Virginia)
- Fei Xu, May 2015 - December 2015

Undergraduate Students:
- Kun Woo Cho, June 2015 - present (Female, SUNY Research Passport Program)
- Christopher Thomas, June 2015 - May 2016 (NSF REU support)
- Matthew Stafford, January 2016 - present
- Tri Vu, June 2016 - present
- Zhuolin Yang, September 2016 - present (Female)
- Vikram Singh, August 2017 - present

EMPLOYMENT

University at Buffalo, the State University of New York (SUNY), New York

Research Assistant, Computer Science & Engineering Department, June 2016 - present
Teaching Assistant, Computer Science & Engineering Department, August 2014 - May 2016

Shanghai Research Institute, Co., Ltd, Shanghai, China

Engineer, Letter Sorting R&D Center, July 2010 - July 2012

TEACHING
ASSISTANT

- CSE341: *Computer Organization*, Spring 2016
- CSE341: *Computer Organization*, Fall 2015
- CSE115/116: *Introduction to Computer Science*, Spring 2015
- CSE115/116: *Introduction to Computer Science*, Full 2014