Eunyong Cheon

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KEYWORDS

Human-Computer Interaction, Usable Security, Biometrics, Authentication, Wearable Computing

RESEARCH PROFILE

Researcher specializing in usable security and human-computer interaction, with a focus on biometric and behavioral authentication for smart devices and wearables. My research investigates the security and usability trade-offs in emerging authentication systems, including gesture-based passwords, motion biometrics, and physiological sensing.

EDUCATION

Ph.D. (2020.03 ~ 2025.02): Biomedical Engineering, Ulsan National Institute of Science and Technology (UNIST)
Advisor: Ian Oakley

- GPA 3.88/4.3
- Dissertation title: Improving Security of Free-Form Gesture Based Authentication

Master (2018.03 ~ 2020.02): Human Factors Engineering, UNIST
Advisor: Ian Oakley

- GPA 3.88/4.3
- Thesis title: Evaluating Gesture Password Selection on Smartphones with Strength Meter

Bachelor (2014.03 ~ 2018.02): 1st Track-Business Administration, 2nd Track-Human Factors Engineering, UNIST

- GPA 3.32/4.3
- TOEIC 945

CAREER

Researcher (2026.05 ~ Present) – Cybersecurity Research Laboratory, National Institute of Information and Communications Technology (NICT), Tokyo, Japan

Post-doctoral Researcher (2025.03 ~ 2026.02) – Information & Electronics Research Institution, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea

PUBLICATIONS

****Honourable Mention Award (Top ~5%)****
Amin Jalilov*, **Eunyong Cheon***, and Ian Oakley. 2026. Leveraging Biometric-Rich Hand Gestures for Head-Mounted Display Authentication. In Proceedings of the CHI Conference on Human Factors in Computing Systems **(**CHI ’26**)**. Association for Computing Machinery, New York, NY, USA.
(*Equal Contribution)

Eunyong Cheon and Ian Oakley. 2025. Securing Gesture Passwords Against Shoulder Surfing Using Behavioral Features. In Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '25). Association for Computing Machinery, New York, NY, USA, Article 473, 1–8.

Hyejin Shin, Jun Ho Huh, Bum Jun Kwon, Iljoo Kim, **Eunyong Cheon**, HongMin Kim, Choong-Hoon Lee, and Ian Oakley. 2024. SkullID: Through-Skull Sound Conduction based Authentication for Smartglasses. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery, New York, NY, USA, Article 834, 1–19.

Eunyong Cheon, Jun Ho Huh, and Ian Oakley. 2023. GestureMeter: Design and Evaluation of a Gesture Password Strength Meter. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 69, 1–19.

Jun Ho Huh, Hyejin Shin, HongMin Kim, **Eunyong Cheon**, Youngeun Song, Choong-Hoon Lee, and Ian Oakley. 2023. WristAcoustic: Through-Wrist Acoustic Response Based Authentication for Smartwatches. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 6, 4, Article 167 (December 2022), 34 pages.

Mintra Ruensuk, **Eunyong Cheon**, Hwajung Hong, and Ian Oakley. 2020. How Do You Feel Online: Exploiting Smartphone Sensors to Detect Transitory Emotions during Social Media Use. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 4, 4, Article 150 (December 2020), 32 pages.

Eunyong Cheon, Yonghwan Shin, Jun Ho Huh, Hyoungshick Kim, and Ian Oakley. 2020. Gesture authentication for smartphones: Evaluation of gesture password selection policies. In *Proceedings of the IEEE Symposium on Security and Privacy (SP '20)*. IEEE, 249–267.

Mintra Ruensuk, Hyunmi Oh, **Eunyong Cheon**, Ian Oakley, and Hwajung Hong. 2019. Detecting negative emotions during social media use on smartphones. In *Proceedings of the Asian CHI Symposium 2019: Emerging HCI Research Collection*, 73–79.

FUNDINGS

- BK21 FOUR (2025)
- Samsung Research (2018 ~ 2022)
- Korea Institute of Design Promotion (2021 ~ 2023, award #1415188809)
- Institute of Information & Communications Technology Planning & Evaluation (2024, award #2710008835)

AWARD

Honourable Mention Award, ACM CHI 2026
Paper: Leveraging Biometric-Rich Hand Gestures for Head-Mounted Display Authentication

2nd Place, 2024 Security@Kaist Fair Poster Presentation, Poster Title: Gesture Biometrics: Hardening Gesture Passwords with Behavioral Features

PATENT

Wearable electronic device and method for performing user authentication in the electronic device, Samsung Electronics Co., Ltd., & Ulsan National Institute of Science and Technology (UNIST), Korean Patent No. 102022009884 (Filed: August 8, 2022)

RESEARCH PROJECTS

Key Inference Attacks Using Smartglasses Captured Video (2025)
- Summary: Evaluated the feasibility of key inference attacks using video recorded by AR glasses
- Tasks: Lead researcher
- Contribution – Time-series motion data synchronization and processing, Deep learning-based frameworks

Device Motion-based Biometric Authentication (2024 ~ 2025)
- Summary: Developed a multilayered authentication system for gesture passwords leveraging motion signals
- Tasks: Lead researcher
- Contribution – Hybrid autoencoder (CNN-LSTM), Time-series motion data processing, Data synthesis

Hand Joint Biometrics for Head Mounted Displays (HMD) (2023 ~ 2025)
- Summary: Developed a tracked-hand joint biometric authentication system for HMDs
- Tasks: Lead researcher
- Contribution – Hand & head behavioral biometrics, In-air gestural input interface

Head Biometric Authentication (2021 ~ 2023)
- Summary: Developed a physiological biometric-based authentication system for smartglasses
- Tasks: Research collaborator
- Contribution – Longitudinal user study, Usability evaluation

Data-Derived Gesture Password Strength Meter (2020 ~ 2022)
- Summary: Designed a secure and usable password composition policy for gesture passwords
- Tasks: Lead researcher
- Contribution – Password strength estimation, Stroke feature extraction, Interactive feedback system

Wrist Biometric Authentication (2020)
- Summary: Developed a physiological biometric-based authentication system for smartwatches
- Tasks: Research collaborator
- Contribution – Electrical impedance tomography, Longitudinal user study, Usability evaluation

Emotion Detection with Commercial Smartphone Sensors (2019 ~ 2020)
- Summary: Designed a system to detect binary emotion status during social media usage on smartphones
- Tasks: Research collaborator
- Contribution – Statistical analysis, Feature Engineering, Machine learning models

Free-Form Gesture based Authentication on Smartphones (2018 ~ 2020)
- Summary: Collected a large-scale gesture dataset from crowd to establish security evaluation framework
- Tasks: Research collaborator
- Contribution – n-gram Markov models for gestures, Stroke discretization, Dictionary-based guessing attacks

MENTORSHIPS

- Research Mentor: WIT Lab (2024 ~ 2025)
- Teaching Assistant: Fundamental Human Factors (2019)
- Teaching Assistant: Capstone Design (2021)
- Research Mentor: Brain to Society (BTS) project (2022)

ACADEMIC SERVICE & EXPERIENCE

- Reviewer: ACM CHI'23 ~ 26, TEI'25, IEEE VR'25, MobileHCI'26
- Student Volunteer: ACM CHI'23
- Research Internships: UNIST Interactions Lab (2016 ~ 2018)
- Visiting Graduate Student: KAIST WIT LAB (2024)

SKILLS

- Programming & Tools**:** Python, R, Java, SQL, HTML/CSS, JavaScript, PHP
- ML & DL Frameworks**:** Scikit-learn, Keras, PyTorch, TensorFlow
- Data Analysis**:** Statistical and Probabilistic modeling, Time-series analysis, Security Usability Evaluation