SEHI L'YI, PhD [sehɪ lɪ:]

sehi_lyi@hms.harvard.edu · https://sehilyi.com · he/him/his · 이세희

SUMMARY

As a researcher working at the intersection of human–computer interaction, data visualization, and biomedical informatics, **I build visualization techniques and tools to help a broad range of people access, analyze, and communicate genomics data.** I have a Ph.D. in Computer Science and Engineering from Seoul National University with 4 years of postdoctoral training at Harvard Medical School. I published first-author papers in high-impact venues in visualization (IEEE VIS, IEEE TVCG), HCI (ACM UIST), and biomedical informatics (Nature Methods, Bioinformatics). I received several academic awards, including Best Paper Honorable Mention at IEEE VIS 2024 (Top 5%) and the NIH K99/R00 Pathway to Independence Award.

APPOINTMENT

NIH K99/R00 Postdoctoral Fellow, Harvard Medical School, MA, USA 2020–present
Department of Biomedical Informatics (DBMI)
Advisor: Dr. Nils Gehlenborg at HIDIVE Lab

EDUCATION

PhD in Computer Science and Engineering, Seoul National University, South Korea 2020
Advisor: Dr. Jinwook Seo at HCI Lab

BS in Computer Science and Engineering, Chungbuk National University, South Korea 2013

FELLOWSHIPS & HONORS

NIH/NHGRI K99/R00 Pathway to Independence Award 2024–present
Up to $249,000 per year for the first three years in a future faculty position

Best Paper Honorable Mention (as the first author), IEEE VIS 2024 (Top 5% of submissions) 2024

Special Recognitions for Outstanding Reviews, ACM CUI 2023 2023

Best Abstract Award (as the first author), ISMB BioVis, 2021 (Top 1 of submissions) 2021

Best Poster Award (as the mentor of the first author), IEEE InfoVis 2020 (Top 1 of submissions) 2020

Best Presentation Award (as the presenter), IEEE BigComp 2017

Naver PhD Fellowship, NAVER Corporation 2016

Google Travel Grants, Google 2016

Outstanding Paper Award, KIISE 2015

Outstanding Paper Award, ICCAS 2013

Silver Medal (as a team leader), iGEM 2012

MEDIA COVERAGE

Nature (Technology Feature), "A graphics toolkit for visualizing genome data." 2022

PUBLICATIONS

Top-tier venues in visualization and human–computer interaction, such as IEEE VIS, IEEE TVCG, ACM CHI, and ACM UIST, are highly selective venues that maintain rigorous review processes.

§ indicates students and staff I mentored.

‡ indicates equal contribution.

Peer-Reviewed Publications

P1 **AltGosling: Automatic Generation of Text Descriptions for Accessible Genomics Data Visualization**
TS Smits[§], **S L'Yi**, AP Mar[§], N Gehlenborg
Bioinformatics, 2024. doi:/10.31219/osf.io/26jvr (accepted)

P2 **Learnable and Expressive Visualization Authoring Through Blended Interfaces**
S L'Yi, A Brandt[§], E Adams[§], HN Nguyen, N Gehlenborg
IEEE TVCG (Proc. VIS 2024), to appear — 23.2% acceptance rate
Best Paper Honorable Mention (Top 5% of submissions)

P3 **Understanding Visualization Authoring Techniques for Genomics Data in the Context of Personas and Tasks**
A Brandt[§], **S L'Yi**, HN Nguyen, N Gehlenborg
IEEE TVCG (Proc. VIS 2024), to appear — 23.2% acceptance rate

P4 **Cistrome Data Browser: integrated search, analysis, and visualization of chromatin data**
L Taing, A Dandawate, **S L'Yi**, N Gehlenborg, M Brown, C Meyer
Nucleic Acids Research, 50(D1) D61-D66, 2024

P5 **Chromoscope: interactive multiscale visualization for structural variation in human genomes**
S L'Yi, D Maziec, V Stevens, T Manz, A Veit, M Berselli, PJ Park[‡], D Glodzik[‡], N Gehlenborg[‡]
Nature Methods, 20, 1834–1835, 2023

P6 **Cistrome Explorer: An Interactive Visual Analysis Tool for Large-Scale Epigenomic Data**
S L'Yi, MS Keller, A Dandawate, L Taing, CH Chen, M Brown, CA Meyer, N Gehlenborg
Bioinformatics, 39(2), btad018, 2023

P7 **Gos: a declarative library for interactive genomics visualization in Python**
T Manz, **S L'Yi**, N. Gehlenborg
Bioinformatics, 39(1), btad050, 2023

P8 **Drava: Concept-Driven Exploration of Small Multiples Using Interpretable Latent Vectors**
Q Wang, **S L'Yi**, N Gehlenborg
ACM CHI, 833, 1-15, 2023 — 27.6% acceptance rate

P9 **Potential pitfalls in the use of real world data to study Long COVID**
HG Zhang, JP Honerlaw, M Maripuri, M Jebathilagam Samayamuthu, BR Beaulieu-Jones, HS Baig, **S L'Yi**, YL Ho, M Morris, V Ayakulangara Panickan, X Wang, GM Weber, KP Liao, S Visweswaran, BWQ Tan, W Yuan, N Gehlenborg, S Muralidhar, RB Ramoni, The Consortium for Clinical Characterization of COVID-19 by EHR (4CE), IS Kohane, Z Xia, K Cho, T Cai, GA Brat
Nature Medicine, 29, 1040–1043, 2023

P10 **Identifying shared genetic architecture between rheumatoid arthritis and other conditions: a phenome-wide association study with genetic risk scores**
HG Zhang, G McDermott, T Seyok, S Huang, K Dahal, **S L'Yi**, C Lea-Bonzel, J Stratton, D Weisenfeld, P Monach, S Raychaudhuri, KH Yu, T Cai, J Cui, C Hong, T Cai, KP Liao
EBioMedicine, 92, 104581, 2023

P11 **Multi-view Design Patterns and Responsive Visualization for Genomics Data**
S L'Yi, N. Gehlenborg
IEEE TVCG (Proc. VIS 2022), 29(1), 559-569, 2023 — 26.5% acceptance rate

P12 **GenoREC: A Recommendation System for Interactive Genomics Data Visualization**
A Pandey[§], **S L'Yi**, Q Wang, M Borkin, N Gehlenborg
IEEE TVCG (Proc. VIS 2022), 29(1), pp.570-580, 2023 — 26.5% acceptance rate
Best Poster Award at IEEE InfoVis 2021 (Top 1 of submissions)

P13 **Gosling: A Grammar-based Toolkit for Scalable and Interactive Genomics Data Visualization**
S L'Yi, Q Wang, F Lekschas, N Gehlenborg
IEEE TVCG (Proc. VIS 2021), 28(1), 40-150, 2022 — 25.8% acceptance rate
Best Abstract Award at ISMB BioVis 2021 (Top 1 of submissions)

P14 **Changes in laboratory value improvement and mortality rates over the course of the pandemic: an international retrospective cohort study of hospitalised patients infected with SARS-CoV-2**
C Hong[‡], HG Zhang[‡], **S L'Yi**[‡], [57 additional authors], T Cai
BMJ Open, 12, 6, 2022

P15 **International comparisons of laboratory values from the 4CE collaborative to predict COVID-19 mortality**
G Weber, C Hong, Z Xia, N Palmer, P Avillach, **S L'Yi**, M Keller, [262 additional authors], I Kohane, T Cai, G Brat, The Consortium for Clinical Characterization of COVID-19 by EHR (4CE)
npj Digital Medicine, 5, 74. 2022

P16 **International electronic health record-derived post-acute sequelae profiles of COVID-19 patients**
HG Zhang, A Dagliati, ZSH Abad, [54 additional authors incl. **S L'Yi**], GM Weber
npj Digital Medicine, 5, 1. 2022

P17 **SurvMaximin: robust federated approach to transporting survival risk prediction models**
X Wang, HG Zhang, X Xiong, [54 additional authors incl. **S L'Yi**], T Cai
Journal of Biomedical Informatics, 134, 104176. 2022

P18 **Comparative Layouts Revisited: Design Space, Guidelines, and Future Directions**
S L'Yi, J Jo, J Seo
IEEE TVCG (Proc. VIS 2020), 27, 2: 1525-1535, 2021 — 25.6% acceptance rate

P19 **International Changes in COVID-19 Clinical Trajectories Across 315 Hospitals and 6 Countries: Retrospective Cohort Study**
GM Weber[‡], HG Zhang[‡], **S L'Yi**[‡], [75 additional authors], G. A Brat
Journal of Medical Internet Research (JMIR), 23, 10, 2021

P20 **International Electronic Health Record-Derived COVID-19 Clinical Course Profiles: the 4CE Consortium**

G Brat, G Weber, N Gehlenborg, P Avillach, N Palmer, L Chiovato, J Cimino, L Waitman, G Omenn, A Malovini, J Moore, B Beaulieu-Jones, V Tibollo, S Murphy, **S L'Yi**, [68 additional authors], I Kohane, npj Digital Medicine, 3(109), 2020

P21 **ProReveal: Progressive Visual Analytics with Safeguards**
J Jo, **S L'Yi**, B Lee, J Seo
IEEE TVCG, 27(7), 3109-3122, 2020

P22 **Toward Understanding Representation Methods in Visualization Recommendations through Scatterplot Construction Tasks**
S L'Yi, Y Chang, D Shin, J Seo
Computer Graphics Forum (Proc. EuroVis), 38(3), 201-211. 2019 — 31.2% acceptance rate

P23 **TouchPivot: Blending WIMP & Post-WIMP Interfaces for Data Exploration on Tablet Devices**
J Jo, **S L'Yi**, B Lee, J Seo
ACM CHI, 2660-2671, 2017 — 25% acceptance rate

P24 **miRTarVis+: Web-based interactive visual analytics tool for microRNA target predictions**
S L'Yi, D Jung, M Oh, B Kim, R Freishtat, M Giri, E Hoffman, J Seo
Methods, 124, 78-88, 2017

P25 **CloakingNote: A Novel Desktop Interface for Subtle Writing Using Decoy Texts**
S L'Yi, K Koh, J Jo, B Kim, J Seo
ACM UIST, 473-481, 2016 — 21% acceptance rate

P26 **XCluSim: A Visual Analytics Tool for Interactively Comparing Multiple Clustering Results of Bioinformatics Data**
S L'Yi, B Ko, D Shin, Y Cho, J Lee, B Kim, J Seo
BMC Bioinformatics (Proc. BioVis 2015), 16 Suppl 11:S5, 2015

P27 **Understanding Users' Touch Behavior on Large Mobile Touch-Screens and Assisted Targeting by Tilting Gesture**
Y Chang, **S L'Yi**, K Koh, J Seo,
ACM CHI, 1499-1508, 2015 — 25% acceptance rate

P28 **Development of smartphone-based stethoscope system**
JY Shin, **S L'Yi**, DH Jo, JH Bae, TS Lee
International Conference on Automation and Systems (ICCAS), 1288-1291, 2013

P29 **Smartphone-based Pupillary Light Reflex Test System**
JY Shin, DH Jo, **S L'Yi**, SY Moon, JH Bae, TS Lee
International Conference on Automation and Systems (ICCAS), 1292-1295, 2013

Preprints

A1 **A comprehensive evaluation of life sciences data resources reveals significant accessibility barriers**
S L'Yi, H Zhang, AP Mar[§], TS Smits[§], L Leru[§], S Rojas[§], A Lex, N Gehlenborg,
OSF Preprints, 2024. doi:10.31219/osf.io/5v98j

Peer-Reviewed Conference Short Papers and Workshop Publications

S1 **Explaining Unfamiliar Genomics Data Visualizations to a Blind Individual through Transitions**
TS Smits[§], **S L'Yi**, NH Nguyen, AP Mar[§] N Gehlenborg
IEEE VIS 1st Workshop on Accessible Data Visualization, 2024. doi:10.31219/osf.io/v7mxz

S2 **Using OpenKeyNav to Enhance the Keyboard-Accessibility of Web-based Data Visualization Tools**
L Weru[§], **S L'Yi**, TS Smits[§], N Gehlenborg
IEEE VIS 1st Workshop on Accessible Data Visualization, 2024. doi/10.31219/osf.io/3wjsa

S3 **The Role of Visualization in Genomics Data Analysis Workflows: The Interview**
S L'Yi, Q Wang, N Gehlenborg
Proc. IEEE VIS 2023, 101-105, 2023 — 33.7% acceptance rate

S4 **Enabling Multimodal User Interactions for Genomics Visualization Creation**
Q Wang, K Liu, MQ Liang, **S L'Yi**, N Gehlenborg
Proc. IEEE VIS, 111-115, 2023 — 33.7% acceptance rate

Book Chapter

B1 **Visual Analytics for Comparing Multiple Clustering Results of Bioinformatics Data**
S L'Yi, B Ko, D Shin, 'YJ Cho, J Lee, B Kim, J Seo
The Wiley Handbook of Human-Computer Interaction, 945-966, 2018

ACADEMIC SERVICES & LEADERSHIP

DEI Committee, Dept. of Biomedical Informatics, Harvard Medical School 2023–present

Accessibility Ambassador, Whole Me Campaign, Harvard University 2023–present

Program Committee, Visualization Notes at IEEE PacificVis 2024 2024

Organizing Committee, Student Volunteer Chair, IEEE PacificVis 2017 2017

Undergraduate Research Intern, College of Medicine, Chungbuk National University 2012—2013
Advisor: Tae-Soo Lee at Ubiquitous Biomedical Systems Development Center (UBDC)

Student Volunteer, ACM CHI 2016 2016

Paper Reviewer, IEEE VIS (2021–present), IEEE TVCG (2023–present), Scientific Reports (2024), Visual Informatics (2024), ACM CHI (2018–2020, 2022–2023), EuroVis (2019, 2023), IEEE PacificVis (2023), ACM UIST (2023), ACM CUI (2023), Journal of Clinical Medicine (2022), PLOS Computational Biology (2022), ACM MobileHCI (2018), Elsevier Methods (2017)

MENTORING EXPERIENCE

Astrid van den Brandt, Visiting PhD student from Eindhoven University of Technology 2023–present
Conducted user studies to understand genomics data authoring workflows · A paper was presented at IEEE VIS 2024 and will appear at IEEE TVCG

Aditeya Pandey, Visiting PhD student at Northeastern University 2020–2021
The construction of a recommendation system for interactive genomics data visualization · The paper was presented at IEEE VIS 2022 and published at IEEE TVCG · Became a Senior Application Developer at Regeneron Genetics Center

Thomas Smits, Associate at Harvard Medical School 2023–present
Improved the accessibility of Gosling genomics visualization · A full paper is under review at Bioinformatics · Another paper was presented at the 1st Workshop on Accessible Data Visualization at IEEE VIS 2024

Lawrence Weru, Associate at Harvard Medical School 2024–present
Worked on improving keyboard accessibility of visualization authoring tools · A paper was presented at the 1st Workshop on Accessible Data Visualization at IEEE VIS 2024

Sofía Rojas, Master's student at Harvard Medical School 2024–present
Improving the accessibility of a HuBMAP data portal using a large language model (LLM)

Theresa Harbig, Visiting PhD student from the University of Tübingen 2023
Extension of Gosling for summary genomics data visualizations

Etowah Adams, Scientific software engineer at Harvard Medical School 2023–2024
Improvement and maintenance of Gosling visualization libraries · Became a graduate student at Columbia University

Andrew Mar, Research Assistant at Harvard Medical School 2024-present
Evaluated life sciences data resources and visualization tools in terms of their accessibility using screen reader assistive technologies

Erica Stutz, Visiting undergraduate student through Harvard Summer Intern Program 2022
Implementation of an edge bundling algorithm for genomics visualizations · Became a graduate student at Yale University

Cynthia Rosas, Visiting undergraduate student through Harvard Summer Intern Program 2021
Implementation of a styling library for the Gosling visualization library

Thanh Dung Ho, Master's student at Seoul National University 2019–2020
The mentee became a software engineer at Accenture

TEACHING EXPERIENCE

Teaching Fellow, Data Visualization for Biomedical Applications, Harvard Medical School 2022, 2023
A graduate-level course with 40–60 students · Designed course materials and assignments

Tutorial at Conference on Intelligent Systems for Molecular Biology (ISMB) 2022
A half-day tutorial with 40-50 participants · Led the development of the tutorial

Guest Lecturer, Information Visualization, Seoul National University 2020, 2021

Teaching Assistant, IT Fundamentals for Bioinformatics, Seoul National University 2016, 2017
A graduate-level course with 30–40 students · Designed 2-hour lecture materials and parts of exams

Head Teaching Assistant, Computer Programming, Seoul National University 2016
An undergraduate-level course with 68 students and 6 teaching assistants · Led the design of the course materials, weekly assignments, and exams · Lectured hands-on classes for C++ and JAVA weekly

Teaching Assistant, Programming Practice, Seoul National University 2014
An undergraduate-level course with 89 students · Designed the course materials, weekly assignments, and exams · Lectured hands-on classes for the C programming language weekly