Amy Glen

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Education

Oregon State University — Corvallis, OR
Ph.D. in Computer Science, GPA: 3.97 — Sept. 2020–June 2024
Thesis: *Computational methods for integrating and querying biomedical knowledge to facilitate translational science*

University of Vermont — Burlington, VT
B.A. in Biology, GPA: 3.95 — 2009–2012

Experience

Oregon State University — Remote
Researcher, Ramsey Lab — 2019-present

- Serve as an architect and primary technical lead for our multi-institutional team within the NIH's NCATS Biomedical Data Translator; engineer key software components of our biomedical knowledge graph and reasoning engine
- Designed and implemented an automated system for building a version of the RTX-KG2 biomedical knowledge graph in which equivalent entities are resolved (RTX-KG2c); became the primary version of the graph and underlies the production RTX-KG2 API
- Engineered two of the ARAX reasoning engine's five core modules: Expand, which answers complex queries by reaching out to dynamically-selected knowledge provider ReST APIs, and Resultify, which identifies intricate result subgraphs from an answer knowledge graph
- Designed and built an in-memory, ontology-integrated graph database platform (PloverDB) that served as the back-end database and reasoning service for the RTX-KG2 API for four years; reduced query times to ≈8% of what they were with the prior Neo4j-based platform
- Expanded PloverDB to serve as a standalone platform (Plover2.0) for hosting and serving biomedical knowledge graphs via standards-compliant web APIs; sped up the RTX-KG2 API by more than 10-times and was also adopted by another team
- Overhauled our team's node synonymization service to use a semi-supervised machine learning graph clustering approach (Label Propagation); greatly reduced Type I errors in entity resolution
- Created interactive visualizations of the Biolink Model hierarchies, used daily across the consortium
- Oversee ongoing development of all of the above tools
- Mentored/guided undergraduate, post-baccalaureate, and graduate students contributing to Translator

PloverAI — Remote
Co-Founder, Principal, Software Engineer — 2023-present

- Co-founded a company that provides advanced biomedical literature search tools, focused on integrating clinical trial information and visualizing results
- Designed, built, and deployed the prototype software product and user interface in summer 2023
- Led initial funding efforts through strategic grant applications in 2024

DTxIntelligence — Remote
Co-Founder, Principal, Software Engineer — 2018-present

- Co-founded a company that provides an evidence-focused competitive intelligence database service for digital therapeutics and connected devices, initially focused on diabetes

- Designed and implemented the core database and web application during the first year; wore many hats, including product manager, software engineer, UI/UX designer, and graphic designer
- Moved to a consulting role once the company was up and running

cvPipeline Remote
Cardiovascular Product Manager 2015-2018

- Managed and edited two of six sectors (Heart Valves and Hypertension) of an R&D intelligence database service for cardiovascular medical devices
- Responsible for keeping the service up to date on the latest clinical trials, regulatory approvals, patents, publications, scientific presentations, and more

VR Analytical Bend, OR
Analyst 2014-2015

- Designed and developed a scientific knowledge database and query system to aid analytical chemists in identifying unknown compounds extracted/leached from pharmaceutical packaging
- Created a financial projections system using VBA and Microsoft Excel that allowed the company to plan ahead more effectively

Publications

[1] S. L. Goetz, **A. K. Glen**, and G. Glusman, "MicrobiomeKG: Bridging microbiome research and host health through knowledge graphs", *bioRxiv*, 2024. DOI: 10.1101/2024.10.10.617697.

[2] G. Qin, K. Narsinh, Q. Wei, J. C. Roach, A. Joshi, S. L. Goetz, S. T. Moxon, M. H. Brush, C. Xu, Y. Yao, **A. K. Glen**, E. D. Morris, A. Ralevski, R. Roper, B. Belhu, Y. Zhang, I. Shmulevich, J. Hadlock, and G. Glusman, "Generating biomedical knowledge graphs from knowledge bases, registries, and multiomic data", *bioRxiv*, 2024. DOI: 10.1101/2024.11.14.623648.

[3] **A. K. Glen**, C. Ma, L. Mendoza, F. Womack, E. C. Wood, M. Sinha, L. Acevedo, L. G. Kvarfordt, R. C. Peene, S. Liu, A. S. Hoffman, J. C. Roach, E. W. Deutsch, S. A. Ramsey, and D. Koslicki, "ARAX: A graph-based modular reasoning tool for translational biomedicine", *Bioinformatics*, vol. 39, no. 3, btad082, Feb. 2023, ISSN: 1367-4811. DOI: 10.1093/bioinformatics/btad082.

[4] K. Fecho, A. E. Thessen, S. E. Baranzini, C. Bizon, J. J. Hadlock, S. Huang, R. T. Roper, N. Southall, C. Ta, P. B. Watkins, M. D. Williams, H. Xu, W. Byrd, V. Dančík, M. P. Duby, M. Dumontier, G. Glusman, N. L. Harris, E. W. Hinderer, G. Hyde, A. Johs, A. I. Su, G. Qin, Q. Zhu, and **The Biomedical Data Translator Consortium**, "Progress toward a universal biomedical data translator", *Clinical and Translational Science*, vol. 15, no. 8, pp. 1838–1847, 2022. DOI: https://doi.org/10.1111/cts.13301.

[5] D. R. Unni, S. A. T. Moxon, M. Bada, M. Brush, R. Bruskiewich, J. H. Caufield, P. A. Clemons, V. Dancik, M. Dumontier, K. Fecho, G. Glusman, J. J. Hadlock, N. L. Harris, A. Joshi, T. Putman, G. Qin, S. A. Ramsey, K. A. Shefchek, H. Solbrig, K. Soman, A. E. Thessen, M. A. Haendel, C. Bizon, C. J. Mungall, and **The Biomedical Data Translator Consortium**, "Biolink model: A universal schema for knowledge graphs in clinical, biomedical, and translational science", *Clinical and Translational Science*, vol. 15, no. 8, pp. 1848–1855, 2022. DOI: https://doi.org/10.1111/cts.13302.

[6] E. C. Wood*, **A. K. Glen***, L. G. Kvarfordt, F. Womack, L. Acevedo, T. S. Yoon, C. Ma, V. Flores, M. Sinha, Y. Chodpathumwan, A. Termehchy, J. C. Roach, L. Mendoza, A. S. Hoffman, E. W. Deutsch, D. Koslicki, and S. A. Ramsey, "RTX-KG2: a system for building a semantically standardized knowledge graph for translational biomedicine", *BMC Bioinformatics*, vol. 23, p. 400, 2022. DOI: 10.1186/s12859-022-04932-3.

[7] Y. Chodpathumwan, A. Termehchy, S. A. Ramsey, A. Shrestha, **A. Glen**, and Z. Liu, "Structural generalizability: The case of similarity search", in *Proceedings of the 2021 International Conference on Management of Data*, ser. SIGMOD '21, Virtual Event, China: Association for Computing Machinery, 2021, pp. 326–338. DOI: 10.1145/3448016.3457316.

* Authors contributed equally to the work.

Presentations

1. Co-presenter, "Working with the Clinical Trials and Drug Approvals KPs, or: How I learned to stop worrying and love the Plover", NCATS Biomedical Data Translator Relay Conference, Washington, D.C., September 2024
2. Presenter, "RTX-KG2 canonicalization: A graph clustering approach to entity resolution", Every Cure Knowledge Sharing Series, virtual (hosted by Every Cure), August 2024
3. Poster, "ARAX: Graph-based modular reasoning for biomedicine", Outstanding Scholars Program Wine & Cheese Event, Oregon State University, Corvallis, OR, January 2023
4. Presenter, "RTX-KG2: A general-purpose biomedical knowledge provider", NCATS Biomedical Data Translator Knowledge Provider Info Working Group, virtual, November 2022
5. Poster, "PloverDB: A speedy, specialized graph database", ARCS Foundation Oregon Annual Scholars Event, Portland, OR, October 2022

Teaching

- **Teaching Assistant** at Oregon State University — Winter 2024, Spring 2024
  Analysis of Algorithms (CS325)
- **Teaching Assistant** at Oregon State University — Winter 2023, Winter 2024
  Networks in Computational Biology (CS446/546)

Technical Skills

- **Programming languages:** Python, C/C++, Bash, Cypher, SQL, JavaScript, TypeScript, HTML/CSS
- **Development tools:** GitHub, git, Docker, AWS, Heroku, OpenAPI, uWSGI
- **Web frameworks:** Django, Angular, Flask
- **Other:** Neo4j, linux/unix, UI/UX design, data visualization, Pandas

Scholarships and Awards

- **ARCS Scholar**, ARCS Foundation Oregon — 2020–2023
- **EECS Outstanding Scholars Fellowship**, Oregon State University — 2020–2022
- **RELU Scholarship**, Oregon State University — 2018, 2019
- **Joan M. Herbers Award in Biology**, University of Vermont — 2012
- **Wasson Athletic Prize**, University of Vermont — 2012
- **Elite 88 Award**, National Collegiate Athletics Association — 2011

Extracurricular Achievements

- Inducted to **UVM Athletic Hall of Fame**, cross-country skiing — 2023
- **NCAA Champion**, cross-country skiing, team and individual — 2012
- **NCAA Division I athlete**, cross-country skiing — 2008-2012
- **U.S. Junior National Champion**, cross-country skiing — 2006, 2008