

Christopher B. Rauch

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Education

PHD IN INFORMATION SCIENCE

GRADUATE MINOR IN COMPUTER SCIENCE

Drexel University: Philadelphia, PA (1 SEP 2019 - present)

MASTER OF SCIENCE IN LIBRARY AND INFORMATION SCIENCE, MASTER OF SCIENCE IN INFORMATION SYSTEMS

Drexel University: Philadelphia, PA, US (1 MAR 2015 - 31 DEC 2016)

<https://drexel.edu/ccf/>

JURIS DOCTOR

Rutgers University School of Law: Camden, NJ, US (1 SEP 2000 -25 MAY 2003)

<https://law.rutgers.edu/>

BACHELOR OF ARTS (ENGLISH)

Rutgers College: New Brunswick, NJ, US (1 SEP 1993 - 16 JUN 1997)

<https://www.rutgers.edu/>

Research Interests

- Ethical Decision Modeling with AI Methods
- Domain-Specific Algorithmic Decision-Making
- Systemic Representation of Decision-Making Processes
- Structured Representation of Large Language Model (LLM) Processes
- Ethical Decision-Making in Cyber-Physical Systems

Publications

Rauch, C. B., Addison, U., Floyd, M., Goel, P., Karneeb, J., Kulhanek, R., Larue, O., Ménager, D., Mainali, M., Molineaux, M., Pease, A., Sen, A., Turner, J., & Weber, R. (2024). Algorithmic Decision-Making in Difficult Scenarios. *Proceedings of the AAAI Symposium Series*, 3(1), 583–585.

<https://doi.org/10.1609/aaais.v3i1.31285>

Rauch, C. B., Kelly, M., Kunze, J. A., & Greenberg, J. (2022). FAIR Metadata: A Community-Driven Vocabulary Application. In E. Garoufallou, M.-A. Ovalle-Perandones, & A. Vlachidis (Eds.), *Metadata and Semantic Research* (pp. 187–198). Springer International Publishing.

https://doi.org/10.1007/978-3-030-98876-0_16

Rauch, C. B. (2021). Advancing ARKs in the Historical Ontology Space. *The Code4Lib Journal*.

<https://journal.code4lib.org/articles/15608>

Rauch, C. B. (2021). Project Pipeline: Preservation, Persistence, and Performance. In *Proceedings of IPRES: 17th Annual Conference on Digital Preservation*. <https://doi.org/10.17605/OSF.IO/JRH54>

Molineaux, M., Weber, R. O., Floyd, M. W., Menager, D., Larue, O., Addison, U., Kulhanek, R., Reifsnnyder, N., **Rauch, C.**, Mainali, M., Sen, A., Goel, P., Karneeb, J., Turner, J., & Meyer, J. (2024). Aligning to Human Decision-Makers in Military Medical Triage. In J. A. Recio-Garcia, M. G. Orozco-del-Castillo, & D. Bridge (Eds.), *Case-Based Reasoning Research and Development* (pp. 371–387). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-63646-2_24

Sen, A., Mainali, M., **Rauch, C. B.**, Addison, U., Floyd, M. W., Goel, P., Karneeb, J., Kulhanek, R., Larue, O., Ménager, D., Molineaux, M., Turner, J., & Weber, R. O. (2024). Counterfactual-Based Synthetic Case Generation. In J. A. Recio-Garcia, M. G. Orozco-del-Castillo, & D. Bridge (Eds.), *Case-Based Reasoning Research and Development* (pp. 388–403). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-63646-2_25

de Oliveira, I. M., McClellan, S., **Rauch, C.**, Adriaenssens, S., & Greenberg, J. (2024). Exploratory analysis of a crowdsourcing metadata tool for building terminological consensus in civil engineering. *Automation in Construction*, 166, 105627. <https://doi.org/10.1016/j.autcon.2024.105627>

Greenberg, J., McClellan, S., **Rauch, C.**, Zhao, X., Kelly, M., An, Y., Kunze, J., Orenstein, R., Porter, C., Meschke, V., & Toberer, E. (2023). Building Community Consensus for Scientific Metadata with YAMZ. *Data Intelligence*, 5(1), 242–260. https://doi.org/10.1162/dint_a_00211

Kelly, M., Ivanovic, D., **Rauch, C. B.**, Kunze, J., Grabus, S., Boone, J., Logan, P. M., & Greenberg, J. (2021, July 20). Archival Resource Keys for Collaborative Historical Ontology Publication. *Proceedings of the ICTeSSH 2021 Conference*. <https://doi.org/10.21428/7a45813f.906ecfac>

Kelly, M., Greenberg, J., **Rauch, C. B.**, Grabus, S., Boone, J. P., Kunze, J. A., & Logan, P. M. (2020). A Computational Approach to Historical Ontologies. *2020 IEEE International Conference on Big Data (Big Data)*, 1878–1883. <https://doi.org/10.1109/BigData50022.2020.9378268>

Conferences and Presentations

“Contextual Archiving of Web Page Advertisements Using Persona-Based Tools.” Lightning talk at the Society of American Archivists (SAA) 2024 Research Forum, Virtual Conference, 17 JUL 2024 <https://www2.archivists.org/am2024/research-forum-2024/agenda>

“Algorithmic Decision-Making in Difficult Scenarios.” Abstract presentation to the Association for the Advancement of Artificial Intelligence (AAAI) 2024 Spring Symposium on Human-Like Learning, Stanford University, Stanford, CA US, 25-27 MAR 2024 <https://humanlikelearning.com/aaai24-ss/>

“Saving Ads: Assessing and Improving Web Archives’ Holdings of Online Ads.” Presentation to International Internet Preservation Consortium (IIPC) Web Archiving Conference (WAC), National Library of France, Paris, France, 24-26 APR 2024 <https://netpreserve.org/ga2024/programme/wac/>

“YAMZ: Yet Another Metadata Zoo.” Presentation to the Coalition for Networked Information (CNI) Spring 2022 Membership Meeting, San Diego, CA, US <https://www.cni.org/events/membership-meetings/past-meetings/spring-2022>

“FAIR Metadata: A Community Driven Vocabulary Application.” Virtual paper presentation to the 2021 Metadata and Semantics Research Conference (MTSR), Madrid, Spain, 29 NOV – 3 DEC 2021
<http://www.mtsr-conf.org/2021/home>

“Project Pipeline: Preservation, Persistence and Performance.” Virtual presentation to 17th International Conference on Digital Preservation, Beijing, China, 19-22 OCT 2021
https://www.ipres2021.ac.cn/en/web/index/11690_950638

“Archival Resource Keys for Collaborative Historical Ontology Publication.” Virtual paper presentation to the International Conference on Information-Communication Technologies enhanced Social Sciences and Humanities (ICTeSSH), Virtual Conference, 28-20 JUN 2021
<https://netpreserve.org/ga2024/programme/wac/>

“Of ARKs and Ontologies.” Presentation to PIDapalooza 2021, the Open Festival of Persistent Identifiers, Virtual Conference, 27 JAN 2021
<https://www.pidapalooza.org/schedule>

“A Computational Approach to Historical Ontologies.” Virtual paper presentation to the 2020 Institute of Electrical and Electronics Engineers (IEEE) International Conference on Big Data, Virtual Conference 10-13 DEC 2020
<https://ai-collaboratory.net/cas/cas-workshops/ieee-big-data-2020-5th-cas-workshop/>

Relevant Professional Experience

RESEARCH FELLOW DREXEL UNIVERSITY

DARPA “In the Moment” Program Participation (ongoing)

- **Algorithmic Decision-Making Explanations:** Developed output descriptions for AI decisions to clarify how answers were justified in domain-specific terms and detailed the machine learning models or AI processes used at each step. Presented findings at the 2023 AAAI Conference on Human-Like Learning at Stanford University.
- **Attribute Weight Determination:** Identified and validated key decision-making attributes through collaboration with experts and conducting quantitative experiments.
- **Alignment and Tuning:** Assessed and fine-tuned the alignment between AI and human decision-makers using dimensionality reduction and clustering techniques to calculate alignment scores.
- **Case-Based Reasoning Support:** Created case-based reasoning systems utilizing domain knowledge to improve AI decision-making accuracy and integrated with large language models (LLMs) for Retrieval Augmented Generation (RAG).

Project Participant, IMLS Funded Grant for Web Advertisement Archiving (ongoing)

- **Archival of Online Advertisements:** Contributed to a project to archive online advertisements, emphasizing their historical significance, and addressing preservation challenges.
- **Archival Practices:** Analyzed existing practices and developed innovative strategies for capturing and storing dynamic web ads.

- **Best Practices Report:** Co-authored a report on best practices for preserving digital advertisements, presented at IIPC WAC 2024 and the SAA Research Forum.
- **Multidisciplinary Collaboration:** Worked with a multidisciplinary team to ensure project success and raise awareness about the importance of web ad archiving for enhancing the historical depth of web collections.

Contributor, Metadata Research Center (ongoing)

- **YAMZ Project:** Played a key role in the YAMZ crowdsourced metadata dictionary, facilitating community-driven metadata creation and management.
- **ARKs (Archival Resource Keys):** Implemented ARKs for the persistent identification of digital objects, enhancing the stability and accessibility of digital archives.
- **Community Consensus Building:** Engaged in efforts to build community consensus for scientific metadata standards, promoting interoperability and standardization.
- **Nineteenth-Century Knowledge Project:** Contributed to transforming the 1910 Library of Congress Subject Headings (LCSH) into the SKOS linked data standard, supporting the study of historical ontologies.
- **Project Pipeline:** Developed and maintained a project pipeline for the preservation, persistence, and performance of historical vocabularies, ensuring computational readiness and long-term accessibility.
- **Encyclopedia Britannica Metadata:** Worked on automatic metadata generation for historical editions of the Encyclopedia Britannica, leveraging both the 1910 LCSH and contemporary vocabularies for enhanced knowledge representation.

Grants and Fellowships

DREXEL UNIVERSITY PHD FELLOWSHIP, Drexel University: Philadelphia, PA (1 SEP 2020 - present)
Awarded to support doctoral studies in Information Science.

LEADS FELLOW, California Digital Library, Oakland, CA (2021)

Library and Information Science Education and Data Science Integrated Network Group (LEADING)
fellowship awarded to collaborate with data scientists, librarians, and IT professionals on the development and enhancement of the California Digital Library's metadata dictionary tool
<https://yamz.net/>

Honors and Awards

Drexel University

Upsilon Pi Epsilon: International Honor Society for the Computing and Information Disciplines

Rutgers University Law School

Co-founder/Editor-in-Chief, Rutgers Journal of Law and Urban Policy (now Public Policy), President, Law and Urban Policy Forum, Dean's Merit Scholar, International Law Society, Bankruptcy Pro Bono Project

US Army Signal Corps Officer Academy

Branch Qualification (honor graduate)

United States Army National Guard

National Defense Service Medal, Army Service Ribbon, Overseas Service Ribbon, Armed Forces Reserve Medal, Global War on Terrorism Service Medal, Iraq Campaign Medal

Rutgers College: Dean's List, Treasurer, Delta Phi Alpha Honor Society, Golden Key National Honor Society, Phi Sigma Iota Honor Society

Professional Memberships

- Association for the Advancement of Artificial Intelligence (AAAI): Palo Alto, CA, US
- Association for Information Science and Technology (ASIS&T): Silver Spring, MD, US
- Institute of Electrical and Electronics Engineers (IEEE): New York, NY, US
- Internet Society: Reston, VA, US
- Society of American Archivists (SAA): Chicago, IL, US

Service

- Mentorship: Mentor for the LEADING program (2022)
- Volunteer Reviewer: Co-reviewed for the Journal of Artificial Intelligence (AIJ), Artificial Intelligence Journal (AIJ), International Conference on Case-Based Reasoning (ICCBR) and the iConference. Graduate student liaison for the Center for Military and Veteran Services during Drexel welcome week.

Relevant Graduate Coursework

Machine Learning, Natural Language Processing Across Domains, Deep Learning, Information Systems Management, Social and Collaborative Computing, Software Development, Software Project Management, Advanced Programming Techniques, Applied Artificial Intelligence, Computational Neuroscience, Content Representation, Distributed Computing and Networking, Evaluation of Information Systems, Healthcare Informatics, Human AI Interaction, Human-Computer Interaction, Information Forensics, Information Retrieval Systems, Information Systems Analysis and Design, Managing Information Organizations, Metadata and Resource Description

Language Skills

- English (Native Speaker)
- German (Advanced Proficiency)

Additional Professional Experience

<https://www.linkedin.com/in/chris2187/details/experience/>

Co-Founder, BeRandom, LLC (JAN 2017 - DEC 2019)

- Launched the drop ship and apparel startup BeRandom, LLC on Shopify and Amazon.
- Registered the LLC and completed business formation requirements.
- Developed the product line and listed items on Amazon and Shopify.
- Created and executed a social media marketing campaign.

Principal Consultant, Heavy Logic, Inc. (JAN 2008 - DEC 2016)

- Developed inventory control and production management software for small-scale CNC manufacturing clients.
- Implemented an ISO 2001 conformance program.
- Created code libraries as a freelancer.

Designed and built web properties using various technologies for diverse clients.

Consultant, QED Intl. and NY State Division of Homeland Security (AUG 2012 - MAY 2014)

- Created user manuals and standard operating procedures for communications equipment used by the NY State Department of Homeland Security.
- Consolidated multiple technical manuals into a single comprehensive guide.
- Interviewed users and technical experts to refine training materials based on the manual.

Consultant, Maher and Maher (MAR 2010 - JUN2012)

- Created comprehensive documentation for legacy information systems at the U.S. Department of Labor.
- Designed and implemented improvements to Workforce3One, the primary web presence of the Department of Labor's Education and Training Administration.
- Led the development of a SharePoint-based resource sharing portal, integrating various third-party applications to provide web-based technical assistance to federal and state employment agencies.
- Designed and oversaw the development of a webinar-centric Community of Practice portal for the U.S. Department of Education.
- Integrated Google search with PageMaps structured data into a SQL-based web portal.
- Rewrote existing code using the MVC design pattern for better management with standard developer tools.

Consultant, Vmoksha, Pvt. Ltd. (Christie's Auctions and Private Sales) (JUN 2008 - FEB 2010)

- Collaborated with external partners and vendors to develop a comprehensive logistics management suite for Christie's Fine Art Auctions, providing near real-time inventory visibility and generating customs and other required documents.
- Integrated the logistics system with internal and external vendor interfaces to reduce costs and eliminate redundancy.
- Fully documented the previous system, including all interfaces and data points.

Integrated Logistics Support Manager, Log.Sec, US Army (OCT 2007 - JAN 2008)

- Coordinated and conducted stakeholder briefings on counter-narcotics efforts in the CENTCOM area of operations.
- Developed a communications support concept for DEA forward-deployed teams.
- Ensured secure data connectivity to military networks by collaborating with long-haul carriers.
- Drafted contract documents for counter-narcotics projects in Afghanistan and Tajikistan.

Senior Logistician, Engineering Products & Solutions (JUN 2006 - SEP 2007)

- Collaborated with the Program Manager and vendors to develop the initial technical configuration of digital land-mobile radios (LMR) and Communications Security (COMSEC) devices.
- Assisted units in creating Standard Operating Procedures for frequency management and key creation, storage, and distribution across Brigades and Divisions.
- Deployed thousands of LMRs to various units across the United States.
- Provided technical support and on-site troubleshooting for field units.
- Coordinated with Division staff and frequency management authorities to ensure successful deployments.
- Supervised and coordinated vendor training for end users on radio systems and encryption devices.

Special Projects Officer, 42ID G6 (Fort Drum, NY and Tikrit, Iraq) (MAY 2004 - DEC 2005)

- Served as G-6 Battle Captain, managing technical staff responsible for mission-critical communications systems.
- Oversaw the implementation of Army Battle Command Systems, ensuring high availability of the Common Operational Picture, and collaborated with Joint Force Staff to commercialize the area communications network.
- Managed the procurement of \$15 million worth of communications equipment.
- Earned Blue Force Tracker (BFT) Digital Master Trainer Certification and implemented database and role reassignment for 851 systems.
- Facilitated technical training for twenty-one enlisted personnel and five officers, equipping them with necessary wartime skills.
- Coordinated with PEO C3T for technical support and refined the 42ID communications architecture with senior engineers.
- Created and implemented a trouble ticket system for network and communication system issues.

Law Clerk to the Hn. Stephen M. Holden, New Jersey Superior Court (SEP 2003 - MAY 2004)

- Conducted extensive legal research and prepared memoranda and recommendations for an average of thirty motions weekly.
- Drafted, edited, and proofread legal correspondence.

Co-Founder, Editor in Chief, Rutgers Journal of Law and Urban Policy (SEP 2001 - MAY 2002)

- Created a business plan, pitched it to faculty, and successfully recruited students.
- Developed a content management system and portal for online publication.
- Secured funding and support from university faculty and alumni.
- Collaborated with external public policy organizations to support the journal's formation and contribute content.

Research Assistant to Professor E. Bernat (University of Graz, Austria) (JUN 2002 - JUL 2002)

- Translated German texts into English.
- Conducted general research in comparative law.

- Assisted in editing articles to be published in a comparative law anthology.

Research Assistant to Dean Rayman Solomon (Rutgers Law School) (JUL 2001 - JAN 2002)

- Researched the reasons behind the lack of innovation in legal education.
- Developed a timeline of major changes in legal pedagogy.

Co-founder, CEO, X22 Converter, LLC (APR 2000 - SEP 2003)

- Responsible for day-to-day operations, client contact, proposal development, and resource management.
- Functioned as the primary developer on all major projects.

Senior Lecturer, University of the Arts (AUG 2000 - MAY 2003)

- Developed and taught interactive programming course for senior multimedia and communications students.
- Taught basic object-oriented programming concepts.

Technologist, C3 Incorporated (JAN 1998 - AUG 2000)

- Contributed significantly to the development of Standard and Poor's Worldwide Electronic Branding Standards and IBM's Java branding strategy.
- Managed and contributed to the successful development of various web projects.

Legal Assistant, Allen Gillman, Esq. (DEC 1993 - JAN 1998)

- Prepared bankruptcy petitions and associated correspondence for numerous clients.
- Enhanced an interactive database system by designing new elements to generate legal documents, track client case histories, and manage and automate correspondence.

Intern, Versorgungsamt Nordrhein-Westfalen (Düsseldorf, Germany) (JUN - AUG 1993)

- Processed and reviewed doctors' payment requests for a German government social service agency.
- Performed data entry tasks.

Technical Support Representative, Hi-Tech Entertainment (JUN - AUG 1992)

- Developed a trouble ticket tracking database to log issues and store solutions to common problems.
- Researched solutions for common technical issues.
- Managed technical support phone calls.

Page, Park Ridge Public Library (JUN 1989 - DEC 1993)

- Shelved books in their proper locations.
- Created electronic catalog entries for the library's collection.
- Tutored ESL students.
- Made acquisition recommendations for new materials.

References

Dr. Rosina Weber

Professor of Information Science, Affiliate Professor of Computer Science

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Dr. Mat Kelly

Assistant Professor, Information Science

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Dr. Jane Greenberg

Alice B. Kroeger Professor and Director, Metadata Research Center

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