YUSUF SERMET

300 S. Riverside Dr., Iowa City, IA 52246-1585, USA | msermet@uiowa.edu

EDUCATION

Ph.D. in Electrical and Computer Engineering	2015-2020
M.S. in Computer Science, *with Software Engineering Subprogram*	2020
M.S. in Electrical and Computer Engineering	2019
The University of Iowa, Iowa City, IA, USA	
B.S. in Computer Engineering	2012-2015
Ege University, Izmir, TURKEY	

RESEARCH EXPERIENCE

Assistant Research Scientist 2022 Dec-**present**
IIHR – **Hydroscience & Engineering,** Iowa City, IA
- Conducting research (e.g., knowledge systems, intelligent sensors, cognitive computing, immersive experiences, web technologies) in Hydroinformatics.
- Other duties include cyberinfrastructure development, grant writing, and research advising.

Postdoctoral Research Scholar 2020 Aug-2022 Dec
IIHR – **Hydroscience & Engineering,** Iowa City, IA
- Designed and developed a web cyberinfrastructure for RIMORPHIS project, funded by the NSF.

Platform Rendering Intern 2018 May-2018 Aug
Mozilla, San Francisco, CA
- Researched and implemented the newly specified CSS Containment Module for Firefox as part of a team. (used C++)

Software Engineer 2017 May-2017 Aug
U.S. Army Corps of Engineers, San Antonio, TX
- Developed, delivered, and documented a web-based decision support tool for Texas Multi-Hazard Tournament. (used Yii Framework, AngularJS and PHP)

Software Engineer 2016 May-2016 Aug
Historide, Irvine, CA
- My duties included bug fixes, new feature implementations in Historide backend, and updates to website layout. (used Ruby on Rails, HAML, and JavaScript)

Graduate Research Assistant 2015 Aug-2020 Aug
IIHR – **Hydroscience & Engineering,** Iowa City, IA
- Conducted research broadly on next-generation environmental sensing, knowledge generation, and communication.
- Research interests include: AI, AR/VR, IoT, GPGPU, Web Dev, and Scientific Vis.

Visiting Research Assistant 2014 Jul-2014 Oct
IIHR – **Hydroscience & Engineering,** Iowa City, IA
- Developed an ontology-based AI framework for voice-enabled natural language Q&A on floods. (used JavaScript, PHP, PostgreSQL)

Research Intern 2013 July
TUBITAK Uzay – Space Technologies Research Institute, Ankara, Turkey
- Implementation of a Real-Time Face Recognition Algorithm to Tübitak's KAVTAN Project. (used C++)

TEACHING & ADVISING EXPERIENCE

- Supervised research projects for **4 postdocs, 16 graduate students, 4 undergraduate students, and 8 high school students**.
- Served as a TA for a graduate-level informatics course for engineering students.
- Tutored students in several Computer Engineering and Science courses.

RESEARCH FUNDING

1. Sermet, Y. (Co-PI), 'Open-Source Community Development for Next-Gen Web Technologies in Hydrological Research and Education'. Source: Midwest Big Data Innovation Hub, 2024-2025. Support: **$35k**

2. Sermet, Y. (Co-PI), 'AI-Enabled Intelligent Assistant (AIIA) for Personalized and Adaptive Learning and Advising: Phase Three'. Source: Innovations in Teaching with Technology, University of Iowa, 2024-2025. Support: **$53k**

3. Sermet, Y. (Co-PI), 'An Intelligent Human-Centric Communication System for Adverse Weather and Road Conditions'. Source: Aurora Pooled Fund Program (IOWA DOT), 2023-2025. Support: **$187k**

4. Sermet, Y. (Co-PI), 'AI-Enabled Digital Twin Framework for Smart Cities: Pilot Study for Iowa Communities'. Source: Seeding Excellence: OVPR Community Engaged Scholars (UIOWA), 2023-2024. Support: **$50k**

5. Sermet, Y. (Co-PI), 'CIROH: AI-Augmented Immersive Digital Twin and Visual Analytics Framework for Hydrology'. Source: National Oceanic and Atmospheric Administration (NOAA), 2023-2024. Support: **$243k**

6. Sermet, Y. (Co-PI), 'Phase 2: AI-Enabled Intelligent Assistant (AIIA) for Personalized and Adaptive Learning and Advising'. Source: Innovations in Teaching with Technology, University of Iowa, 2023-2024. Support: **$30k**

7. Sermet, Y. (Co-PI), 'HydroLang: An Open-Source Web-Based Programming Framework for Hydrological Sciences'. Source: Hydroinformatics Innovation Fellowship, CUAHSI, 2022-2023. Support: $5k

8. Sermet, Y. (Co-PI), 'AI-Enabled Intelligent Assistant (AIIA) for Personalized and Adaptive Learning and Advising'. Source: Innovations in Teaching with Technology, University of Iowa, 2022-2023. Support: $25k

9. Sermet, Y. (Co-PI), 'A Serious Game on Flood Mitigation for K-12 and Public Education'. Source: National Science Foundation (NSF) and Iowa Water Center, 2021-2022. Support: $5k

10. Sermet, Y. (Postdoctoral Researcher), 'River Morphology Data and Analysis Tools (RiverMorph) – A web platform for enabling river morphology research', Source: NSF Geoinformatics, 2020-2023. Support: $504K

11. Sermet, Y. (PI), 'Next-Generation Stage Measurement at Ungauged Locations using IoT'. Source: United States Geological Survey and Iowa Water Center, 2020-2021. Support: $5k

12. Sermet, Y. (Collaborator), 'Knowledge Discovery, Integration and Communication for Extreme Weather and Flood Resilience Using Artificial Intelligence'. Source: AI for Earth, Microsoft & ESRI, 2017-18. Support: $20K (Credits for Cloud Services and ESRI Software)

13. Sermet, Y. (Collaborator), 'Flood Action VR: A Virtual Reality Framework for Disaster Awareness and Emergency Response Training'. Source: The Weather Channel, IBM, 2017. Support: $10K

14. Sermet, Y. (Collaborator), 'Decision Support Tool for the Texas Multi-Hazard Tournament'. Source: United States Army Corps of Engineers, 2017. Support: $41K

PENDING GRANTS

15. Sermet, Y. (Co-PI), 'Development of Foundational Large and Multimodal Language Models for Hydrology Research and Education'. Source: NSF NAIRR, 2024-2025. Support: Computational Resources (*submitted – pending decision*)

16. Sermet, Y. (Co-PI), 'CIROH: AI-Augmented Immersive Digital Twin and Visual Analytics Framework for Hydrology - Phase 2'. Source: National Oceanic and Atmospheric Administration (NOAA), 2024-2026. Support: **$400k** (*submitted – pending decision*)

17. Sermet, Y. (Co-PI), 'Collaborative Research: Sustained Resources: RIMORPHIS: Enabling River Morphology Research and Education through Community Oriented Cyberinfrastructure'. Source: NSF Geoinformatics, 2024-2027. Support: **$1M** (*submitted – pending decision*)

18. Sermet, Y. (Co-PI), 'VILCO - Virtual Intelligent Learning Coach for Enhanced Help-Seeking and Personalized Feedback'. Source: NSF CSSI, 2024-2027. Support: **$600k** (*submitted – pending decision*)

19. Sermet, Y. (Co-PI), 'AI-Enabled Workforce Development for Next Generation Career Pathways in Water Infrastructure'. Source: Environmental Protection Agency (EPA), 2024-2027. Support: **$450k** (*submitted – pending decision*)

20. Sermet, Y. (Co-PI), 'POSE: Phase I: An Open-Source Ecosystem of Next-Gen Web Technologies for Hydrological Education, Research, and Operations (OSE-HERO)'. Source: NSF POSE, 2024-2025. Support: **$300k** (*submitted – pending decision*)

21. Sermet, Y. (Co-PI), 'FloodAware : An open-source conversational web tool for community flood risk assessment'. Source: Amazon AI Awards, 2024-2025. Support: **$105k** (*submitted – pending decision*)

PATENTS (pending)

1. Demir, Ibrahim, and Muhammed Yusuf Sermet. "Camera-Based Liquid Stage Measurement." U.S. Patent Application 17/223,270, filed October 7, 2021. URL: https://patents.google.com/patent/US20210310807A1

ACADEMIC PUBLICATIONS

1. Merwade, V., Demir, I., Muste, M., Cox, A.L., Minear, J.T., **Sermet, Y.**, Dey, S. and Liang, C.Y., 'Towards an Open and Integrated Cyberinfrastructure for River Morphology Research in the Big Data Era', 2024. (in review) *SSRN Preprint*. 10.2139/ssrn.4733286

2. Sajja, R., Erazo, C., Li, Z., Demiray, B., **Sermet, Y.**, Demir, I., 'Integrating Generative AI in Hackathons: Opportunities, Challenges, and Educational Implications', 2024. (in review) arXiv preprint DOI: 10.48550/arXiv.2401.17434

3. Sajja, R., **Sermet, Y.**, Cwiertny, D., Demir, I., 'Integrating AI and Learning Analytics for Data-Driven Pedagogical Decisions and Personalized Interventions in Education', British Journal of Educational Technology, 2023. (in review) arXiv preprint DOI: 10.48550/arXiv.2312.09548

4. Mount, J., **Sermet, Y.**, Jones, C., Schilling, K., Gassman, P.W., Weber, L.J., Krajewski, W.F. and Demir, I., 'UMIS: An Integrated Cyberinfrastructure System for Water Quality Resources in the Upper Mississippi River Basin', Science of the Total Environment, 2023. (in review) arXiv preprint DOI: 10.31223/X5FM3S

5. Sajja, R., **Sermet, Y.**, Cikmaz, M., Cwiertny, D., Demir, I., 'Artificial Intelligence-Enabled Intelligent Assistant for Personalized and Adaptive Learning in Higher Education', Education and Information Technologies, 2023. (in review) arXiv preprint DOI: 10.48550/arXiv.2309.10892

6. Demiray, B.Z., **Sermet, Y.**, Yildirim, E., Demir, I., 'FloodGame: An Interactive 3D Serious Game on Flood Mitigation for Disaster Awareness and Education', Environmental Modeling and Software, 2023. (in review) EarthArXiv preprint DOI: 10.31223/X5ST0T

7. Cox, A.L., Muste, M., Merwade, V., Demir, I., Minear, J.T., Dey, S., Liang, C.Y., & **Sermet, Y.**, 'Engaging the Earth Science and Engineering Communities in Developing a River Morphology Information System (RIMORPHIS)', Journal of the American Water Resources Association, 2023. (in review) EarthArXiv preprint DOI: 10.31223/X5P08N

8. Yesilkoy, S., Baydaroglu, O., Singh, N., **Sermet, Y.**, Demir, I., A Contemporary Systematic Review of Cyberinfrastructure Systems and Applications for Flood and Drought Data Analytics and Communication', Earth-Science Reviews, 2023. (in review) EarthArXiv preprint DOI: 10.31223/X5937W

9. Satilmisoglu, T. K., **Sermet, Y.**, Demir, I., 'Blockchain Applications and Opportunities for Water Resources and Hydrology: A Systematic Review', Hydrology, 2023. (in review) EarthArXiv Preprint DOI: 10.31223/X5594K

10. Erazo, C., **Sermet, Y.**, & Demir, I., 'HydroCompute: An Open-Source Web-Based Computational Library for Hydrology and Environmental Sciences', Environmental Modeling and Software, 2023. (in press) EarthArXiv preprint DOI: 10.31223/X5FM2D

11. Pursnani, V., **Sermet, Y.**, & Demir, I., 'Performance of ChatGPT on the US Fundamentals of Engineering Exam: Comprehensive Assessment of Proficiency and Potential Implications for Professional Environmental Engineering Practice', Computers and Education, 2023. DOI: 10.1016/j.caeai.2023.100183

12. Baydaroğlu, O., Yeşilköy, S., **Sermet, Y.**, Demir, I., 'A Comprehensive Review of Ontologies in the Hydrology Towards Guiding Next Generation Artificial Intelligence Applications', Journal of Environmental Informatics, 2023. DOI: 10.3808/jei.202300500

13. Sajja, R., **Sermet, Y.**, Cwiertny, D., Demir, I., 'Platform-Independent and Curriculum-Oriented Intelligent Assistant for Higher Education', International Journal of Educational Technology in Higher Education, 2023. DOI: 10.1186/s41239-023-00412-7

14. Ramirez, C., **Sermet, Y.**, Demir, I., 'HydroLang Markup Language: Community-Driven Web Components for Hydrological Analyses', Journal of Hydroinformatics, 2023. DOI: 10.2166/hydro.2023.149

15. Shahid, M., **Sermet, Y.**, Mount, J., Demir, I., 'Towards Progressive Geospatial Information Processing on Web Systems: A Case Study for Watershed Analysis in Iowa', Earth Science Informatics, 2023. DOI: 10.1007/s12145-023-00993-x

16. **Sermet, Y.**, Demir, I., 'Camera-Based Intelligent Stream Stage Sensing for Decentralized Environmental Monitoring', Journal of Hydroinformatics, 2023. DOI: 10.2166/hydro.2023.032

17. Demir, I., **Sermet, Y.**, Rink, K., 'Editorial: Next Generation Visualization and Communication Systems for Earth Science Using Immersive Reality and Serious Gaming', Frontiers in Earth Science, 2022. DOI: 10.3389/feart.2022.1101538

18. Ramirez, C., **Sermet, Y.**, Molkenthin, F., Demir, I., 'HydroLang: An Open-Source Web-Based Programming Framework for Hydrological Sciences', Environmental Modelling & Software, 2022. DOI: 10.1016/j.envsoft.2022.105525

19. **Sermet, Y.**, Demir, I., 'GeospatialVR: A Web-based Virtual Reality Framework for Collaborative Environmental Simulations', Computers & Geosciences, 2022. DOI: 10.1016/j.cageo.2021.105010

20. **Sermet, Y.**, Demir, I., 'A Semantic Web Framework for Automated Smart Assistants: A Case Study for Public Health', Big Data and Cognitive Computing, 2021. DOI: 10.3390/bdcc5040057

21. Teague, A., **Sermet, Y.**, Demir, I., Muste, M., 'A collaborative serious game for water resources planning and hazard mitigation', Int. Journal of Disaster Risk Reduction, 2021. DOI: 10.1016/j.ijdrr.2020.101977

22. **Sermet, Y.**, Demir, I., 'An Immersive Decision Support System for Disaster Response', In 26th ACM Symposium on Virtual Reality Software and Technology, 2020. DOI: 10.1145/3385956.3422087

23. Sit, M., Demiray, B.Z., Xiang, Z., Ewing, G., **Sermet, Y.**, Demir, I., 'A Comprehensive Review of Deep Learning Applications in Hydrology and Water Resources', Water Science and Technology, 2020. DOI: 10.2166/wst.2020.369

24. **Sermet, Y.**, Demir, I., Muste, M., 'A Serious Gaming Framework for Decision Support on Hydrological Hazards', Science of the Total Environment, 2020. DOI: 10.1016/j.scitotenv.2020.138895

25. **Sermet, Y.**, Villanueva, P., Sit, M.A., Demir, I., 'Crowdsourced approaches for stage measurements at ungauged locations using smartphones', Hydrological Sciences Journal, 2020. DOI: 10.1080/02626667.2019.1659508

26. **Sermet, Y.**, Demir, I., 'A Generalized Web Framework for Domain-Independent Natural Language Question Answering', arXiv preprint arXiv:1909.02507, 2019.

27. Sit, M.A., **Sermet, Y.**, Demir, I., 'Optimized watershed delineation library for server-side and client-side web applications', Open Geospatial Data, Software and Standards, 2019. DOI: 10.1186/s40965-019-0068-9

28. **Sermet, Y.**, Demir, I., 'Towards an Information Centric Flood Ontology for Information Management and Communication', Earth Science Informatics, 2019. DOI: 10.1007/s12145-019-00398-9

29. **Sermet, Y.**, Demir, I., Kucuksari, S., 'Overhead Power Line Sag Monitoring through Augmented Reality', 50th North American Power Symposium, September 9-11, 2018, Fargo, ND. DOI: 10.1109/NAPS.2018.8600565

30. **Sermet, Y.**, Demir, I., 'Flood Action VR: A Virtual Reality Framework for Disaster Awareness and Emergency Response Training', Int'l Conference on Modeling, Simulation and Visualization Methods (MSV'18), Jul 30-Aug 2, 2018, Las Vegas, NV. DOI: 10.1145/3306214.3338550

31. **Sermet, Y.**, Demir, I., 'An Intelligent System on Knowledge Generation and Communication about Flooding', Environmental Modelling & Software, 2018. DOI: 10.1016/j.envsoft.2018.06.003

32. Demir, I., Yildirim, E., **Sermet, Y.**, Sit, M.A., 'FLOODSS: Iowa Flood Information System as a Generalized Flood Cyberinfrastructure', The International Journal of River Basin Management, 2017. DOI: 10.1080/15715124.2017.1411927

BOOK CHAPTERS

33. **Sermet, Y.**, Demir, I. Chapter on 'A Semantic Web Framework for Automated Smart Assistants: A Case Study for Public Health', Book: "Knowledge Modelling and Learning through Cognitive Networks", MDPI. Edited by Stella, M., Kenett Y.N., 2022.

34. **Sermet, Y.**, Demir, I. Chapter on 'Virtual and Augmented Reality Applications for Environmental Science Education and Training', Book: "New Perspectives on Virtual and Augmented Reality: Finding New Ways to Teach in a Transformed Learning Environment", Taylor & Francis. Edited by L. Daniela et al., 2020.

PHD DISSERTATION

35. **Sermet, Yusuf**, 'Knowledge Generation and Communication in Intelligent and Immersive Systems: A Case Study on Flooding', 2020.
    Supervisors: Ibrahim Demir, Assistant Professor, Civil and Environmental Engineering, University of Iowa, USA.
    Anton Kruger, Professor, Electrical and Computer Engineering, University of Iowa, USA.

PROFESSIONAL ACTIVITIES

Editorial Board, Frontiers in Environmental Science (IF: 5.411)	2022-present
Proposal Reviewer, NSF Cyberinfrastructure for Sustained Scientific Innovation (CSSI) program	2022
Guest Editor, Frontiers in Earth Science (IF: 3.498)	2021-present
Topic Editorial Board, Water journal (IF: 2.544)	2021-present
Reviewer Board, Journal of Marine Science & Engineering (IF: 2.033)	2021-present

Grant Reviewer, University of Iowa Postdoctoral Association (UIPDA)   2021-present
International Scientific Committee, 1st IAHR Young Professionals Congress   2020-present
Reviewer Board, Big Data and Cognitive Computing Journal   2020-present
Volunteer, ACM SIGGRAPH – 47th Annual Conference   2020
Grant Proposal Reviewer, Iowa Academy of Science   2020
Program Committee, ENVIRVIS under the Eurovis Conference   2019-present
Volunteer, 8th International Conference on Flood Management (*Triennially held since 2000*)   2019-2020
Organizer, Conference on Celebrating Diversity in Engineering, University of Iowa   2019-2020
Grant Reviewer, Graduate & Professional Student Government, University of Iowa   2019-2020
Trainee, Software Engineering Training, Wallbreakers   2019
Organizer, UIowa High School Hackathon, Liberty High School, Iowa City   2018
President, HACKUIOWA - Annual Midwest Hackathon, University of Iowa   2016-present
Member, Information Technology Advisory Committee, Office of the President, University of Iowa   2016-17 & 2019-20
Member, the International Student Advisory Board, University of Iowa   2016-17
Judge, 1) American Geophysical Union Poster Showcase, 2) James F. Jakobsen Graduate Conference   2015-16

DEI-RELATED PROFESSIONAL ACTIVITIES

Conference on Celebrating Diversity in Engineering, University of Iowa
Served as an organizer to assist with the planning, outreach, fundraising, finding speakers, and gifts.

University of Iowa Hackathon (HACKUIOWA)
Served as an organizer with a plethora of duties including ensuring an inclusive environment for all backgrounds.

Software Engineering Training Program, Wallbreakers
Was a part of a tech community to train, empower, and connect software engineering students from diverse and underrepresented backgrounds.

University of Iowa High School Hackathon
Served as an organizer for a high school hackathon to encourage and build CVs of the next generation of engineers.

International Student Advisory Board, University of Iowa
Server as a member to advocate for a more inclusive environment for international students in the campus.

ACM Celebration of Diversity in Computing (i.e. Tapia Conference)
Actively involved with this international ACM society as a presenter, grantee, and awardee since 2017.

REVIEWER FOR JOURNALS

- Environmental Modeling and Software, Elsevier
- Weather and Forecasting, AMS
- Science of the Total Environment, Elsevier
- Int. Journal of Computers and Applications, Taylor & Francis
- International Journal of Disaster Risk Reduction, Elsevier
- Journal of Atmospheric and Oceanic Technology, AMS
- International Journal of Geo-Information, MDPI
- Data, MDPI
- Natural Hazards, Springer
- Big Data and Cognitive Computing, MDPI
- Health Informatics Journal, SAGE
- Water Resources Research, AGU
- SoftwareX, Elsevier
- Journal of Hydroinformatics, IWA
- Earth Science Informatics, Springer
- PLOS One
- Water, MDPI
- Sustainability, MDPI
- J. of Marine Science and Engineering, MDPI
- Frontiers in Psychology
- Computers & Graphics, Elsevier
- Applied Geography, Elsevier
- Int. J. of Env. Research and Public Health, MDPI
- Frontiers in Earth Science

AWARDS AND RECOGNITIONS

Phase 3 Contestant, CHARIoT Challenge, The National Institute of Standards and Technology   2020
Fellowship, Graduate College Summer Fellowship, by University of Iowa   2020
Elected, Member for Phi Beta Delta – International Honor Society   2020
Entrepreneurship Award, NSF UI Innovators Workshop, by John Pappajohn Entrepreneurial Center (JPEC)   2019

Creative Kickstarter Award, 'Next-Generation Stage Measurements Using IoT', University of Iowa	2019
Best in JavaScript, 'National Flood Resilience Assistant', HackISU	2019
2nd Place, Tapia Student Poster Competition, Tapia Conference (i.e. ACM Celebration of Diversity in Computing)	2019
Best Poster, in Electrical and Computer Engineering, College Of Engineering Open House, UIowa	2019
Outreach Award, 'Flood Expert – AI System for Flooding', by Association of State Floodplain Managers	2018
Product of the Year, 'Multi-Hazard Tournament', by US Army Engineer Institute for Water Resources (IWR)	2018
Featured, in Dare to Discover Banner Series in Downtown Iowa City. Headline: **Dare to Deploy Artificial Intelligence**	2018
Runner-Up Award, 'AGU Data Visualization and Storytelling Competition', by NASA and AGU	2017
Research Grant of $20k, 'AI for Earth', by **Microsoft and ESRI**, Award: Azure Cloud Services and ESRI Software	2017
2nd Place, The Weather Channel SDC Innovation Challenge, by Samsung and IBM	2017
Various Travel Grants, by NSF, NVIDIA, NASA, CUAHSI, CGRER, UI GPSG, UI GSS, IWC, CyberGIS, UI College of Eng.	2016-present
Best Machine Vision/Object Detection Hack, 'Holographic Zombie Survival Game using HoloLens', HackISU	2016
2nd Place, Poster Contest, Iowa Water Conference, Iowa Water Center	2016
Elected, Member for Sigma Xi - The Scientific Research Society	2016
Innovation Award, 'Combining IoT with Crowdsourcing for Natural Disasters', HackISU	2016

MEDIA COVERAGE

News: 'UI engineering study finds ChatGPT could pass exam needed to become licensed engineer'
UI College of Engineering News

Area: Immersive Systems for Sustainability
United Nations Policy Brief (Interview) ([URL](URL))

Project: 'Flood Action VR'
ESRI City Engine Show (Episode Highlight) ([URL](URL))

Project: 'Next-Generation Stage Measurement at Ungauged Locations using IoT'
Iowa Water Center (Interview), Iowa Water Conference (Highlight), ISU Getting into Soil and Water journal (Interview)

Project: 'Decision Support Tool for Texas Multi-Hazard Tournament'
US Army Corps of Engineers – Sacramento District

Project: 'Alternative Approaches for Smartphone-Based Crowdsourced Water Level Measurements'
UI College of Engineering News (Highlight)

Dare to Discover Campaign: 'Dare to Deploy Artifical Intelligence'
UI Research and Economic Dev., IIHR News, IFC News, College of Engineering News (Highlight), Electrical and Comp. Eng. News

Project: 'Flood AI: An Intelligent System for Discovery and Communication of Disaster Knowledge'
KCRG TV9, Government Technology, The Daily Iowan, IIHR News, Iowa Now, IFC News, College of Engineering News (2 articles)

Project: 'Holographic Flood Resilience Platform'
*Bulletin of American Meteorological Society (BAMS) – March 2017 (**Cover**) (**Impact Factor: 7.929**), Report on Alerting Tactics by **the Department of Homeland Security***

Event: 'HackUIowa - Midwest Hackathon'
University of Iowa YouTube Channel (Interview), CBS 2, KWWL, The Gazette, IIHR News (Highlight), Daily Iowan (Interview), Iowa Now (Interview), Iowa Flood Center (Featured)

Project: 'Combining IoT with Crowdsourcing for Natural Disasters'
College of Engineering News (Highlight), IIHR News (Interview), UIowa Research, UI Graduate College, Iowa Engineer Magazine

COMPUTATIONAL SKILLS

Engineering Software	Unity, Matlab, Protege, ModelSim, Multisim, Ultiboard

Programming Languages	**Languages and Frameworks**: C++, JavaScript, Python, PHP, jQuery, HTML5, WebGL, Java, Ruby on Rails, NodeJS, C, C#, SQL, Apex, Scheme, Verilog, AngularJS, TypeScript, Dafny, A-Frame, React **Assembly Languages**: 8086, 8051 **Embedded Programming**: ARM Cortex M4F, Arduino, Raspberry Pi
Operating Systems	Windows, Linux Ubuntu/openSUSE/CentOS, Mac OS X
Productivity & DevOps	NGINX, MS Visual Studio, Eclipse, Android SDK, Cloud9, Heroku, MS Azure, pgAdmin, MS SQL Server, Firebase, Git, Mercurial, SVN, IntuiFace, VS Code, Phabricator, Jasmine, MS Office, Open Office

PRESENTATIONS

More than 60 conference presentations as both oral and poster, including GPU Technology Conference, SIGGRAPH, AGU Fall Meeting, ACM VRST, Tapia Conference, AWWA Annual Conference, AMS Annual Meeting, iEMSs, ICFM, CyberGIS, CIROH, and more.

1. **Sermet, Y.**, Demir, I., Muste, M., 'RIMORPHIS: A Comprehensive Web-Based Cyberinfrastructure for River Morphology Research', AGU Fall Meeting. December 11-15, 2023, San Francisco, CA.

2. Merwade, V., Demir, I., Minear, J.T., Muste, M., Cox, A., Liang, C.Y., Dey, S., **Sermet, Y.**, 'RIMORPHIS - An information system for accessing and processing river morphology data', AGU Fall Meeting. December 11-15, 2023, San Francisco, CA.

3. Erazo, C., **Sermet, Y.**, Shahid, M., Demir, I., 'HydroRTC: A Web-Based Communication Library for Collaborative Data Sharing in the Hydrological Domain', AGU Fall Meeting. December 11-15, 2023, San Francisco, CA.

4. Ramirez, C., **Sermet, Y.**, Demir, I., 'HydroLang, HydroLang-ML, and HydroCompute: A Web-based Software Suite for Client-Side Environmental and Hydrological Analyses', Iowa Water Conference, September 19-20, 2023, Altoona, IA.

5. **Sermet, Y.**, Demir, I., 'River Morphology Information System Cyberinfrastructure Overview', 3rd Annual NSF RIMORPHIS Stakeholder Workshop, June 22, 2023, Boulder, CO.

6. **Sermet, Y.**, Pursnani, V., Singh, N., Demir, I., 'Development of an Intelligent Hydroinformatics Chatbot and Virtual Educational Assistant for Enhancing Learning and Research in the Hydrological Domain', CIROH Annual Training and Developers Conference, May 16-18, 2023, Salt Lake City, UT.

7. **Sermet, Y.**, Demir, I., 'Next-Generation Web Technologies, AI and Intelligent Systems Applications in Geoscience', Iowa Flood Center, February 1, 2023, Iowa City, IA.

8. Demir, I., **Sermet, Y.**, Sajja, R., 'AI-Enabled Intelligent Assistant (AIIA) for Personalized and Adaptive Learning and Advising', The UI Support Community for Instructional Technology Meeting, February 1, 2023, Iowa City, IA.

9. Merwade, V., Minear, J.T., Muste, M., Cox, A., Demir, I., Dey, S., Liang, C.Y., **Sermet, Y.**, "Introducing RIMORPHIS, the River Morphology Information System: An Online Community Resource for River Morphology Data and Tools", AGU Fall Meeting. December 14, 2022, Chicago, IL.

10. **Sermet, Y.**, Demir, I., 'Next-Generation Environmental Information Systems using Immersive Technologies and Artificial Intelligence', Young Professionals Workshop - Lowering Flood Risk by Increasing Resilience: Next Generation Vision for Flood Science and Action, August 9-10, 2022, Iowa City, IA.

11. **Sermet, Y.**, Demiray, B., Yildirim, E., Demir, I., 'FloodGame: A Serious Game on Flood Mitigation for K-12 and Public Education', Frontiers in Hydrology Meeting, June 19-24, 2022, San Juan, Puerto Rico.

12. **Sermet, Y.**, Demir, I., Muste, M., 'A Web-Based Visualization and Analytics Cyberinfrastructure for River Morphology', Frontiers in Hydrology Meeting, June 19-24, 2022, San Juan, Puerto Rico.

13. **Sermet, Y.**, Demir, I., 'Camera-Based Intelligent Stream Stage Sensing', Frontiers in Hydrology Meeting, June 19-24, 2022, San Juan, Puerto Rico.

14. **Sermet, Y.**, Demir, I., 'River Morphology Information System Cyberinfrastructure Overview and Demo', Rimorphis 2nd Annual Stakeholder Workshop, May 19, 2022, Online.

15. **Sermet, Y.**, Demir, I., Muste, M., 'A Web-Based Visualization and Analytics Cyberinfrastructure for River Morphology', American Geophysical Union (AGU) Fall Meeting, December 13-17, 2021, New Orleans, LA.

16. **Sermet, Y.**, Demir, I., 'Camera-Based Intelligent Stream Stage Sensing for Citizen Science Applications', American Geophysical Union (AGU) Fall Meeting, December 13-17, 2021, New Orleans, LA.

17. **Sermet, Y.**, Demir, I., 'Next-Generation Environmental Information Systems using Immersive Technologies and Artificial Intelligence', 3rd NOAA Workshop on Leveraging AI in Environmental Sciences, September 13-17, 2021, Virtual.

18. **Sermet, Y.**, Demir, I., 'GeospatialVR: A Web-based Virtual Reality Framework for Collaborative Disaster Simulations', Iowa Water Conference, April 6-8, 2021, Ames, IA

19. **Sermet, Y.**, Demir, I., 'GeospatialVR: A Web-based Virtual Reality Framework for Collaborative Environmental Simulations', Disaster PRIMR 2021, January 31 – February 4, 2021, Online.

20. **Sermet, Y.**, Demir, I., 'GeospatialVR: A Web-based Virtual Reality Framework for Collaborative Environmental Simulations', American Geophysical Union (AGU) Fall Meeting, December 1-17, 2020, Online.

21. **Sermet, Y.**, Demir, I., 'An Immersive Decision Support System for Disaster Response', 26th ACM Symposium on Virtual Reality Software and Technology, November 1-3, 2020, *Online*.

22. **Sermet, Y.**, Demir, I., 'Virtual and Augmented Reality Applications for Disaster Planning and Education', ESRI Water Conference, September 23-25, 2020, *Online*.

23. **Sermet, Y.**, Demir, I., 'Next-Generation Environmental Information Systems using Immersive Technologies and Artificial Intelligence', Tapia 2020 - ACM Celebration of Diversity in Computing, September 16-19, 2020, *Online*.

24. *Cancelled due to COVID-19* - **Sermet, Y.**, Demir, I., 'Next-Generation Environmental Information Systems using Immersive Technologies and Artificial Intelligence', The 8th International Conference on Flood Management, August 17-19, 2020, IC, IA

25. **Sermet, Y.**, Demir, I., 'Next-Generation Stage Measurement at Ungauged Locations using Internet of Things', Iowa Water Conference, April 8-9, 2020, Ames, IA

26. **Sermet, Y.**, Demir, I., 'Virtual Stage Sensors: Alternative Approaches for Smartphone-Based Crowdsourced Water Level Measurements', Tapia 2019 - ACM Richard Tapia Celebration of Diversity in Computing, September 18-21, 2019, San Diego, CA.

27. **Sermet, Y.**, Demir, I., 'Flood Action VR: A Virtual Reality Framework for Disaster Awareness and Emergency Response Training', ACM SIGGRAPH 2019, July 28- August 1, 2019, Los Angeles, CA.

28. **Sermet, Y.**, Demir, I., Virtual Stage Sensors: Alternative Approaches for Smartphone-Based Crowdsourced Water Level Measurements" The 17th Annual College of Engineering Research Open House, April 11, 2019, Iowa City, IA, USA.

29. Demir, I., **Sermet, Y.**, 'Integration of Intelligent Systems and Novel Visualization Techniques in Data-Driven Geoscience Education', AGU Fall Meeting, December 10-14, 2018, Washington, DC.

30. **Sermet, Y.**, Demir, I., 'Flood Action VR: A Virtual Reality Framework for Disaster Awareness and Emergency Response Training', Tapia 2018 - ACM Richard Tapia Celebration of Diversity in Computing, September 19-22, 2018, Orlando, FL.

31. **Sermet, Y.**, Demir, I., 'Flood AI: An Intelligent Systems for Discovery and Communication of Disaster Knowledge', 9th International Congress on Environmental Modelling and Software, June 24-28, 2018, Fort Collins, CO.

32. Demir, I., **Sermet, Y.**, Krajewski, W.F., 'An Intelligent System for Discovery and Communication of Extreme Events', AMS Annual Meeting, January 7-11, 2018, Austin, TX, USA.

33. Demir, I., **Sermet, Y.**, 'Flood AI: An Intelligent Systems for Discovery and Communication of Disaster Knowledge', AGU Fall Meeting, December 11-15, 2017, New Orleans, LA, USA.

34. **Sermet, Y.**, Demir, I., 'Flood Action VR: A Virtual Reality Framework for Disaster Awareness and Emergency Response Training', Samsung Developer Conference, October 18-19, 2017, San Francisco, CA, USA.

35. **Sermet, Y.**, Demir, I., 'Knowledge Discovery, Integration and Communication for Extreme Weather and Flood Resilience Using Artificial Intelligence: Flood AI Alpha', Tapia Conference, September 20-23, 2017, Atlanta, GA, USA.

36. Yildirim, E., **Sermet, Y.**, Demir, I., 'Web-based Flood Damage Estimation and Emergency Management', 2017 CUAHSI Conference on Hydroinformatics, July 25-27, 2017, Tuscaloosa, AL, USA.

37. **Sermet, Y.**, Sit, M.A., Demir, I., 'Benchmark of Client and Server-Side Catchment Delineation Approaches on Web-Based Systems', 2017 CUAHSI Conference on Hydroinformatics, July 25-27, 2017, Tuscaloosa, AL, USA.

38. Demir, I., **Sermet, Y.**, 'Intelligent Systems and Knowledge Discovery for Data-Driven Communication and Education', 2017 CUAHSI Conference on Hydroinformatics, July 25-27, 2017, Tuscaloosa, AL, USA.

39. **Sermet, Y.**, Sit, M.A., Demir, I., 'Real-Time Web-Based Watershed Delineation Using Javascript, Python, And Webgl', AWWA Annual Conference and Exposition (ACE17), June 11-14, 2017, Philadelphia, PA, USA.

40. Demir, I., **Sermet, Y.**, 'Intelligent Systems and Knowledge Discovery for Communication of Extreme Weather and Disaster Preparedness', GPU Technology Conference, May 8-11, 2017, San Jose, CA, USA.

41. **Sermet, Y.**, Agliamzanov, R., Sit, M.A., Demir, I., 'Scientific Computations On Gpu On The Web: A Use Case Of Distrubuted Volunteer Computing For Hydrologıcal Applications', GPU Technology Conference, May 8-11, 2017, San Jose, CA, USA.

42. **Sermet, Y.**, Sit, M.A., Demir, I., 'Benchmark of Client and Server-Side Catchment Delineation Approaches on Web-Based Systems', Iowa Water Conference, March 23-24, 2016, Ames, IA, USA.

43. Villanueva, P., **Sermet, Y.**, Demir, I., 'Virtual Stream Stage Sensor Using Projected Geometry and Augmented Reality for Crowdsourcing Citizen Science Applications', American Geophysical Union (AGU) Fall Meeting, December 12-16, 2016, SF, CA.

44. Demir, I., **Sermet, Y.**, 'Knowledge Discovery, Integration and Communication for Extreme Weather and Flood Resilience Using Artificial Intelligence: Flood AI Alpha', American Geophysical Union (AGU) Fall Meeting, December 12-16, 2016, SF, CA.

45. Sit, M.A., **Sermet, Y.**, Demir, I., 'Flood and Weather Monitoring Using Real-time Twitter Data Streams', American Geophysical Union (AGU) Fall Meeting, December 12-16, 2016, San Francisco, CA, USA.

46. **Sermet, Y.**, Sit, M.A., Demir, I., 'Benchmark of Client and Server-Side Catchment Delineation Approaches on Web-Based Systems', American Geophysical Union (AGU) Fall Meeting, December 12-16, 2016, San Francisco, CA, USA.

47. Yildirim, E., **Sermet, Y.**, Demir, I., 'Flood Damage and Loss Estimation for Iowa on Web-based Systems using HAZUS', American Geophysical Union (AGU) Fall Meeting, December 12-16, 2016, San Francisco, CA.

48. Sit, M.A., **Sermet, Y.**, Demir, I., 'Real-Time Flood Monitoring and Preparedness Using Twitter Data Streams', 12th Int. Conference on Hydroinformatics (HIC) 2016, August 21-26, 2016, Incheon, South Korea.

49. **Sermet, Y.**, Demir, I., 'Towards a Generalized Knowledge Engine for Disaster Preparedness and Response', 12th Int. Conference on Hydroinformatics 2016, August 21-26, 2016, Incheon, South Korea.

50. **Sermet, Y.**, Demir, I., 'Information Centric Disaster Ontology for Environmental Cyberinfrastructure Systems', 12th Int. Conference on Hydroinformatics (HIC) 2016, August 21-26, 2016, Incheon, South Korea.

51. **Sermet, Y.**, Sit, M.A., Demir, I., 'Real-Time Watershed Delineation on the Client-side Web Applications', The 3rd International Conference on CyberGIS and Geospatial Data Science, July 26-28, 2016, Urbana, IL

52. **Sermet, Y.**, Demir, I., 'Web-Based Knowledge Generation for Early Disaster Response and Recovery', AWWA Annual Conference and Exposition (ACE16), June 20-22, 2016, Chicago, IL, USA.

53. Chitale, A., Hegeman, J., **Sermet, Y.**, Thirupatti, B., 'Towards an IoT Based Concussion Assessment and Impact Analysis Framework', Modern Marvels, May 5, 2016, Iowa City, IA, USA.

54. **Sermet, Y.**, Demir, I., 'Computational Knowledge Engine for Hydrological Systems using Semantic Web, Iowa Informatics Showcase Symposium, April 22, 2016, Iowa City, IA, USA.

55. **Sermet, Y.**, Demir, I., 'Client-side GPGPU Web Application for Catchment Delineation and Watershed Segmentation', GPU Technology Conference, April 4-7, 2016, San Jose, CA, USA.

56. **Sermet, Y.**, Demir, I., Krajewski, W.F., 'Automatic Knowledge Generation for Disaster Management using Ontology', Iowa Water Conference, March 23-24, 2016, Ames, IA, USA.

57. **Sermet, Y.**, Demir, I., Krajewski, W.F., 'Information Centric Disaster Ontology for Environmental Cyberinfrastructure Systems', Iowa Water Conference, March 23-24, 2016, Ames, IA, USA.

58. Demir, I., **Sermet, Y.**, Krajewski, W., 'Voice-enabled Knowledge Engine using Ontologies and Natural Language Processing for Weather and Hydrological Data', 2016 AMS Annual Meeting, January 10-14, 2016, New Orleans, LA, USA.

59. Demir, I., **Sermet, Y.**, Krajewski, W.F., 'Voice-enabled Knowledge Engine using Flood Ontology and Natural Language Processing', American Geophysical Union (AGU) Fall Meeting, December 14-18, 2015, San Francisco, CA, USA.

60. **Sermet, Y.**, Demir, I., A Comprehensive Flood Ontology for Environmental Cyberinfrastructure Systems', Presented at the December 2015 Graduate Virtual Poster Showcase, AGU Showcase, Washington, DC.

61. Sit, M.A., **Sermet, Y.**, Demir, I., 'Real-time Social Media Analysis for Flood Monitoring and Prediction - Twitter Use Case', Presented at the December 2015 Undergraduate Virtual Poster Showcase, AGU Showcase, Washington, DC.

CREATIVE SOFTWARE WORKS

Virtual Intelligent Teaching Assistant
- A conversational framework that can answer course-specific questions and provide self-study mechanisms.
- Developed with JavaScript with a fine-tuned language model based on GPT, as a team effort.

RIMORPHIS (Funded by NSF)
- Developed an entire web cyberinfrastructure for river morphology research at the national scale.
- Developed with nginx (server), PostGRESQL (db), PostgREST (API), NodeJS and Python (backend), and React (frontend).

UMIS (Funded by NSF)
- Developed the frontend, map visualizations, analytics tools for the Upper Mississippi Information System.

GeospatialVR (*Paper*)
- Developed a web-based virtual reality framework for collaborative environmental simulations created dynamically.
- Developed with Unity, C#, JavaScript, HTML5, and NodeJS.

Semantic Web Framework for Automated Chatbots (*Paper*)
- Developed with JavaScript, heuristic algorithms, and deep learning models.

Camera-Based Water Monitoring Sensor (*Patent, Paper*)
- Designed and implemented a novel approach to estimate water levels using a camera.
- Deployed it as a stand-alone sensor using a Raspberry Pi.

National Flood Resilience Assistant

- Developed a web system to analyze flood risk, damages, and mitigation options for every residential property in US.
- Worked on product design, frontend development, and backend integration.

A Generalized Web Component for Domain-Independent Voice Assistants (*Paper*)
- Developed a web component to integrate voice-enabled question answering systems to any website.
- Developed with JavaScript using Web Components, Shadow Dom, Event Bubbling, and CSS Containment.

Augmented Reality enabled Power Systems Analyzer (*Conference Paper*)
- An AR-enabled Android application to infer utility pole conditions using image processing.

Flood Action VR Game (2nd Place / 200+ projects) (*Conference Paper*)
- A mobile Flood Simulation Virtual Reality Game that can be used by emergency responders and public.
- Project awarded by Samsung and IBM.

HoloFlood (*Journal Cover*)
- Developed a holographic flood resilience platform by recreating real-world while analyzing social & economic impact.
- Developed with Unity and Microsoft HoloLens using C#

Crowdsourced Stream Stage Measurement (*Paper*)
- Developed an Android-based augmented reality application utilizing mobile sensors.
- Implemented the mathematical models developed by other project members.

Watershed Delineation (*Paper*)
- Designed and developed a GPGPU algorithm to delineate watersheds using the client-side GPU.
- Developed with WebGL, JavaScript, and HTML5

Flood AI as a Service
- Developed web services to integrate the following technologies with IFIS Flood AI;
  - Skype, Facebook Messenger, Google Assistant, Cortana, Slack, E-mail bots,
  - Google Home and Amazon Alexa connections, IFTTT and MS Flow integrations, Oculus VR app integration.

IFIS Flood AI (*Paper*)
- Developed a novel artificial intelligence framework for flood related knowledge generation;
  - Knowledge Base: A comprehensive flood ontology **(*Paper*)**
  - NLP Module, Inference Engine, and Scoring Module
- Used PHP, JavaScript, HTML5 and PostgreSQL.