

# Catherine B. Cramer

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## Interdisciplinary Data Science Education Leader

Seasoned scientific and technical program professional with proven record of excellence in managing portfolios of innovative interdisciplinary education programs to address specific sector challenges. Demonstrable expertise in environmental, ocean, marine, and climate change domains. Proven aptitude in cultivating solution-based approaches and supporting data-intensive computing and cyberinfrastructure collaborative research projects and communities of practice spanning multidisciplinary programs to provide resources, services, and expertise to the national research and education community. Demonstrated ability to design and implement a metric tracking framework for a large, distributed team across multiple organizations. Ability to assess needs for information technology products and design services to meet those needs. Familiarity with tools, platforms, and structures and demonstrated ability to plan for new technical learning initiatives into the IT workflow. Demonstrated capacity to anticipate obstacles and plan for contingencies and to assess progress toward goals based on monthly metrics and milestones. Knowledge of computing and communications including hardware infrastructure, networking, software, and operations. Excellent writing and report management skills.

### Areas of Expertise

- Program Design & Execution
- Partnership Development
- Project Management
- Reporting and Metrics
- Community Building
- Big Data Education & Training
- Grant Proposal Writing
- Challenge Resolution
- Team Facilitation
- Progress Tracking
- FAIR Research Data Management
- Strategic Planning
- Science Communication
- Funded Program Development
- Budget Management

## Professional Experience

**RESILIENT WOODS HOLE**

2021 – Present

### **Consultant**

Designing and implementing strategies for the engagement of community members and government officials in the development of a strategic plan for addressing the effects of climate change on a local level.

**SAN DIEGO SUPERCOMPUTER CENTER (SDSC), UC San Diego**

2020 – Present

### **Director Outreach & Engagement, Data Initiatives**

Cultivating and building strategic interdisciplinary partnerships amongst faculty, research, education, industry and communities focused on growing the impact of SDSC through the application of data analytics. Creating pathways for access for underserved communities and building out service opportunities. SDSC liaison to national and international research societies and conferences. Project proposal development and oversight. Creation of new interdisciplinary on-campus partnerships

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**WEST BIG DATA INNOVATION HUB, UC San Diego**

2020 - Present

**Deputy Director**

Creating strategic roadmap for sustainability; building new partnerships and opportunities for support. Creating novel ways to enlarge the impact of current projects and ensuring their sustainability. Developing participatory team and group work design; growing efforts to engage diverse communities with data science. Strategizing long-term funding plans. Developing key messaging for communication.

**WOODS HOLE INSTITUTE (WHI), Woods Hole, MA**

2018 - Present

**Founder and Principal**

Non-profit startup. Management, strategic planning, and capacity building for advancing actionable research, education and policy. The Woods Hole Institute is an interdisciplinary, non-profit entity that brings research and academic institutions, thinkers, and doers together to amplify their efforts in advancing actionable knowledge toward addressing complex 21st-century challenges, with a focus on environmental and economic issues affecting coastal communities. WHI also sponsors events and gatherings as a third space for science, humanities, and the arts.

**EARTHCUBE OFFICE, UC San Diego, San Diego, CA**

2020 – 2023

**Assistant Director**

Management of a large NSF-funded initiative consisting of interconnected projects and activities that engage the geosciences, cyberinfrastructure, computer science, and associated communities. *Duties:* collaborate with EarthCube Office team and EarthCube community to meet goals and deadlines in managing project budget and team progress metrics as well as subawardee contract expenditures. Significant contributions to report writing and communication with technical leads as well as drafting and managing cooperative agreement documentation, review, and planning process.

**CONNECTING COASTAL COMMUNITIES, University of Massachusetts Boston**

2021-2023

**Consultant**

Building on work with coastal communities done with Woods Hole Institute, providing strategies and management for the development of workshops to engage two local communities (representing the Cape Verdean and Wampanoag communities) in surfacing their concerns about the effects of climate change on them and the local environment.

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ASSOCIATED UNIVERSITIES, INC. (AUI), Washington, DC

2018 - 2022

## Consultant

Network for Earth-space Research Education and Innovation with Data (NEREID). NEREID advances research and innovation through education and engagement with big data in earth-space sciences. *Duties:* devise research and education and innovation initiatives, perform strategic planning, formulate partnerships, and build community of practice to fund and support large-scale education initiatives in space and geosciences.

COLUMBIA UNIVERSITY DATA SCIENCE INSTITUTE, New York, NY

2014 - 2021

*Northeast Big Data Innovation Hub (NEBDIH):* Founder and developer, Data Science for All (DS4All), a national initiative to provide access to data literacy resources across formal and informal education settings, workforce development avenues, and for the general public, with a particular emphasis on communities of need, supported by the National Science Foundation through the Northeast Big Data Innovation Hub, part of the Data Science Institute. Co-PI on projects including ongoing Data Literacy Workshops and Social Network Analysis of the Hub network.

## Manager of Industry Engagement

2018 - 2019

Positioned to establish, maintain, and strengthen professional partnerships between global industry partners and academia. Organized programming opportunities to achieve enhanced engagement between partners and students/faculty. Developed and enlarged awareness of funding opportunities for multidisciplinary data science education and research. *Key Projects: Developed and managed data science education consortium with key industry partners. Organized and managed full-day workshop for data science C-suite partners. Developed and organized capstone projects, created campus poster session series with Center Chairs. Engaged 5 new industry partners during tenure.*

NEW YORK HALL OF SCIENCE (NYSCI), Flushing Meadows Corona Park, NY

2012 - 2018

## Senior Program Developer

Spearheaded planning, development, and management of global network science, big data literacy, and teaching/learning program for communities of need.

*New York Hall of Science Key Projects:*

### **Data & Modeling Literacy**

- **Northeast Big Data Innovation Hub:** Initiated and led NYSCI's role as education partner in NSF-funded initiative, developing collaborations among regional thought leaders, data scientists, and learning researchers to identify and resolve issues of big data literacy/equity. Organized capacity-building workshops, prepared data literacy framework, and delivered report to government/research community for smooth execution of program.
- **Data Modeling:** Managed NSF-funded data literacy and modeling workshops for young learners and their families.

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- **Network Science for the Next Generation:** Managed NSF-funded community development and career readiness project to provide opportunities for disadvantaged high school students to perform network science research.
- **Network Science in Education:** Served as developer, organizer, and international symposium chair to promote community of network science educators and practitioners and build network literacy capacity for global learners.

## *STEM Funders Network STEM Learning Ecosystems Initiative*

- **Queens 2020:** co-developed and managed program to build robust community network in Corona and engage school district/highly diverse community with STEM resources and provide pathways for STEM careers.
- **Mobile City Science:** Oversaw project to involve recently immigrant high school students in using digital technology tools to create maps and address issues of equity/learning.
- **Parent University:** Structured curriculum to support local parents in addressing their child's learning needs.
- **Science Ambassadors:** Provided homework support and optimized STEM activities for local families.
- **STEM Ecosystems:** Built practice engagement with diverse communities and families.

## *Learn X Design - Noyce Foundation Grant-funded Project*

- Managed project to support collective effort of seven science museums.
- Standardized design-based learning activities through development of a guidebook/media-rich website.

## *Hudson River Estuarium*

- Headed content and partnership development to organize exhibit/education content and business plan for a new science education center in Lower Manhattan.

## *Living Breakwaters - Citizens Advisory Committee & Education Committee*

- Advised on HUD-funded post-sandy restoration and resilience project across onshore public education sites.

*Additional experience as Founder & Developer, Communications & Outreach Manager, Electronic Communications Producer, Media Strategist, Freelance Science Writer/Editor/Columnist, and Documentary Film Editor.*

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## Funded Research & Program Development (Co-PI, Senior Personnel)

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Global Center on Climate Change and Water Energy Food Health Systems (GC3WHEF). San Diego Supercomputer Center, University of California San Diego/ NIH, 2023-present

West Big Data Innovation Hub, San Diego Supercomputer Center, University of California San Diego/NSF, 2023-present

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EarthCube Office, San Diego Supercomputer Center, University of California San Diego/ NSF, 2020-2023

Connecting Coastal Communities, University of Massachusetts Boston/NSF, 2021-2023

Network for Earth-space Research, Education and Innovation with Data, Associated Universities Incorporated / NSF, 2019 – Present.

Northeast Big Data Innovation Hub: Big Data Literacy: Building Capacity for Regional Collaboration in Closing the Big Data Divide (Columbia University / NSF, 2016 – Present.

Hudson River Estuarium, York Hall of Science/Clarkson University / New York State Dept. of State and Dept. of Environmental Conservation, 2015 - Present.

Data Modeling with Young Learners and Their Families, New York Hall of Science/NSF. 2016 – 2018.

Museum Design Collaborative; New York Hall of Science; Noyce Foundation, 2014-2016

Network Science for the Next Generation, SUNY Binghamton/Boston University/New York Hall of Science / NSF, 2011- 2017.

Ocean Communities in Education and Social Networks - University of Massachusetts / New York Hall of Science / Boston Public Schools / Association for the Sciences of Limnology and Oceanography / Centers for Ocean Science Education Excellence / NSF, 2010 – 2016

Climate Interpreter.Org; New England Aquarium; NOAA and NSF, 2010-2012

## Outreach and Education Projects

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Twelfth Network Science and Education Symposium. In conjunction with the International School and Conference on Network Science (NetSci 2023) Central European University, Vienna, Austria (organizer)

Eleventh Network Science and Education Symposium. online (organizer);2022

Tenth Network Science and Education Symposium: online (organizer);2021

Data Science for All: Designing the Successful Inclusion of Data Science in High School Computer Science. New York Hall of Science and Columbia University, Cornell Tech, New York, NY (organizer) 2020

NEREID Earth-Space Data Convergence Accelerator Workshop, Associated Universities, Inc. Green Bank Observatory, Green Bank, WV (organizer) 2019

Data Literacy in Communities (March 2018) Organizer and facilitator of day-long workshop bringing CBOs, public libraries, and data practitioners together to explore ways to deepen data literacy within underserved communities.

Data for Good Exchange (Bloomberg). Organizer and moderator of workshops and panels on connecting communities of need with data resources to solve local problems. (2017, 2018)

LabVenture Re-launch (Fall 2018) Gulf of Maine Research Institute, Portland, ME (invited panelist, advisor);

Seventh Network Science and Education Symposium. In Conjunction with the International Workshop & Conference on Network Science (NetSci 2018), Institut des Systèmes Complexes de Paris, France (organizer)

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Big Data Fest. Founder and Developer. Development and management of public festival to introduce the public to big data applications through over 40 hands-on activities, workshops, performances, and talks. (2015) (organizer)

International Workshop on Complex Networks (CompleNet VI) Organizer, Co-PI and Host for global network science conference (2015)

SUBMERGE. Founder and Lead Organizer. New York City's first and only ocean science festival, held in Lower Manhattan. This annual event (started in 2015 as part of COSEE OCEAN) on Pier 26 offers thousands of attendees engaging hands-on activities, presentations, demonstrations, and performances.

World Maker Faire. Developer and manager of hands-on data acquisition and ocean science public activities and organization of pre- and post- event conferences on making and learning. The New York Hall of Science is the host of World Maker Faire, which attracts over 100,000 visitors to this annual weekend event.

Tracing Learning Across Time & Space. Co-organizer and Host. NSF-funded capacity building initiative for data analysis of digital learning (2015).

Making Meaning Symposium, Organizer and host NSF and Moore Foundation funded conference on making and learning (2012).

Technology Entertainment and Design (TED) satellite event in Woods Hole (2010)

TEDxWoodsHole Creator, Host and Organizer. Massachusetts marine science community (2010, 2011).

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## Publications and Presentations

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Bastón, R., Catherine, C., Daly, A., Hudson, F.D., Liou, Y., Naum, K., Thompson, W, Umer, L & Uzzo, S. (2023). An Investigation of the Northeast Big Data Innovation Hub through Social Network Analysis. In: *The Social Leader: Catalyzing Networks for Educational Change* (C., Daly & Liou, Y., Eds.). Bloomsbury Publishing.

Stella, M., Kapuza, A., Cramer, C., & Uzzo, S. (2021). Mapping computational thinking mindsets between educational levels with cognitive network science. *Journal of Complex Networks*, 9(6), cnab020.

Kirkpatrick, Christine R.; Coakley, Kevin ; Cragin, Melissa H.; Cramer, Catherine; McHenry, Kenton; Marini, Luigi; Kooper, Rob; Glasgow, James; Foster, Ian T.; Szalay, Alex S.; Simmel, Derek (2021). Open Storage Network Concept Paper: Open Storage Network Retrospective & the Future of Distributed Storage for eInfrastructure. In San Diego Supercomputer Center (SDSC) Research Data Services Materials Collection. UC San Diego Library Digital Collections. <https://doi.org/10.6075/JORR1ZCR>  
<https://library.ucsd.edu/dc/object/bb56058395>

Uzzo, S.; Cramer, C.; Sayama, H.; Faux, R. (2021) NetSci High: Bringing Agency to Diverse Teens Through the Science of Connected Systems; *New England Journal of Complex Science*; April 2021; <https://academic.oup.com/comnet/article/9/6/cnab020/6424446>

*Accelerating Convergence of Earth and Space Data in Teaching and Learning Through Participatory Design*, Earth Science Information Partnership Federation Winter Meeting, Bethesda, MD (panelist) 2020

*Network for Earth-space Research, Education and Innovation with Data (NEREID): Collaboration for Earth-Space Data Science Education and Practice*, in session: Reaching the Researcher: Collaborations Between Educators, Scientists, and the Public for the Advancement of STEM and Geosciences II, American Geophysical Union Fall Meeting, San Francisco, CA (poster). December 2019

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*Data Science for All*; Invited talk; International Society for Systems Science (ISSS) 63rd annual meeting; OSU, Corvallis OR. June 30, 2019

*Data Science for All*; invited talk; Bloomberg Quant Seminar; Bloomberg LLC; April 30, 2019

*Data Science for All: Empowering Communities to Solve Wicked Problems*; invited talk; Northeast Regional Conference on Complex Systems (NERCCS); SUNY Binghamton; April 5, 2019

*NiCE Teacher Workshop: Engaging K-12 Teachers in the Development of Curricular Materials That Utilize Complex Networks Concepts*; Emma Towlson, Lori Sheetz, Raluca Gera, Jon Roginski, Catherine Cramer, Stephen Uzzo; Complicity, [Vol 15, No 1 \(2018\)](#)

Cramer C., Porter M., Sayama H., Sheetz L., Uzzo S. (eds); *Network Science In Education*. Springer, Cham.; October 2018

Cramer C.B., Sheetz L. (2018) *Secondary Student Mentorship and Research in Complex Networks: Process and Effects*. In: Cramer C., Porter M., Sayama H., Sheetz L., Uzzo S. (eds) *Network Science In Education*. Springer, Cham.

Taylor, K.H., Silvis, D., Kalir, R., Negron, A., Cramer, C., Bell, A. & Riesland, E. (Accepted with revisions). *Supporting public-facing education for youth: Spreading (not scaling) ways to learn data science with mobile and geospatial technologies*. CITE: Journal of Contemporary Issues in Teacher Education.; September 2018

*Network for Earth-space Research Education and Innovation with Data: NEREID*, Earth Science Information Partners Summer Meeting, Tacoma, WA (Poster) 2018

*Addressing Community Challenges with Data-Driven Solutions*; Workshop organizer; Data for Good Exchange; Bloomberg Finance, LLP. September 2018.

*Envisioning the Data Science Discipline: The Undergraduate Perspective: Interim Report*; National Academies of Sciences, Engineering and Medicine; March 2018; contributing author

*Keeping Data Science Broad Report*; published by South Big Data Innovation Hub, January 2018; co-author

*Big Picture for a Big Data Science Education Network – Next Steps*; webinar presenter, Data Literacy; sponsored by South Big Data Innovation Hub; January 16, 2018

*National Academies Roundtable on Data Science Education: Alternative Institutional and Educational Mechanisms, Panel on Informal Data Science Education* (with S. Uzzo and K Borner), October, 2017, Kellogg School of Management, Northwestern University.

*Data For Good Exchange. Creating Actionable Data-Driven Knowledge in Communities of Need*. Panel organizer. Bloomberg Finance, LLP. September 24, 2017.

National Academies of Sciences, Engineering, and Medicine. (2017). *Envisioning the Data Science Discipline: The Undergraduate Perspective: Interim Report*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24886>.

Sayama, H., Cramer, C., Sheetz, L., & Uzzo, S. (2017). NetSciEd: Network science and education for the interconnected world. *Complicity: International Journal of Complexity in Education*, Vol. 14, No 2. <https://journals.library.ualberta.ca/complicity/index.php/complicity/article/view/29339>

Sayama, H., Cramer, C., Porter, M. A., Sheetz, L., & Uzzo, S. (2016). What are essential concepts about networks?. *Journal of Complex Networks*, 4(3), 457-474.

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Cramer, C., Porter, M. A., Sayama, H., Sheetz, L., & Uzzo, S. (2015). *Network Literacy: essential concepts and core ideas*. NetSciEd. Available online at <http://tinyurl.com/networkliteracy>.

McCann, B. M., Cramer, C. B., & Taylor, L. G. (2015). *Assessing the impact of education and outreach activities on research scientists*. *Journal of Higher Education Outreach and Engagement*, 19(1), 65-78.

Cramer, C., Sheetz, L., Sayama, H., Trunfio, P., Stanley, H. E., & Uzzo, S. (2015). *NetSci High: bringing network science research to high schools*. In *Complex Networks VI: Proceedings of the 6th Workshop on Complex Networks CompleNet 2015* (pp. 209-218). Springer International Publishing.

*The Maker's Brain: Networks, creativity and learning*; Links Conference, MIT Media Lab, July 2013 (speaker)

*Making Meaning Conference Report*, published May 2013, Funded by Moore Foundation, Time Warner and NSF. (author/editor)

*The 3-Minute Solution: Communicating Your Research in Short, Effective Videos*; Session: 117: Communicating a Changing Ocean: Challenges and Opportunities Facing Scientists and Decision Makers; 2012 Ocean Sciences Meeting Salt Lake City, February 2013

*Measuring Success of Federally-Funded STEM Education Networks*; NetSciEd symposium, NetSci conference, Northwestern University June 2012

*Ripple Effects: Small-scale Investigations into the Sustainability of Ocean Science Education Networks*; poster, WIN Social Networks Summit, Stern School of Business, NYU September 2011; Poster, Chen, R., Cramer, C., DiBona, P., Faux, R., & Uzzo, S. (2013). *Ripple Effects: Small-Scale Investigations into the Sustainability of Ocean Science Education Networks*. In *Complex Networks, Studies in Computational Intelligence*, 424. A. Evsukoff, M. González, R. Menezes, Eds. Berlin: Springer Publishing Company., 141-147.

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## Education

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Bachelor of Arts, focus on communications and media

Graduate Dept. of Cinema Studies, Master's course work

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## Boards and Advisory

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Board Member, Network Science Society

Council Member, Marine Biological Laboratory

Science Advisory Council Member, Eden Project, Cornwall UK

Advisory Board Member, Pittsburgh DataWorks

Board Member, Children's School of Science

Board Member, Living Breakwaters

Trustee, The Woods Hole Bell Tower Trust