

Matthew P. Dube

Associate Professor of Data Science, Computer Information Systems, and Applied Mathematics,
University of Maine at Augusta

Cooperating Graduate Faculty, Graduate School of Biological Sciences and Engineering, University of
Maine

Cooperating Faculty, Division of Environmental and Biological Sciences, University of Maine at Machias

External Graduate Faculty, School of Computing and Information Science, University of Maine

Randall Student Center, Rm. 230, Augusta, ME 04330

matthew.dube@maine.edu

<http://www.uma.edu/directory/staff/matthew-p-dube>

EDUCATION**The University of Maine**

Ph.D., Spatial Information Science and Engineering

May 2016

Thesis: Algebraic Refinements of Direction Relations through Topological Augmentation

Advisor: Max J. Egenhofer

The University of Maine

Graduate IGERT Certificate in Sensor Science, Engineering, and Informatics

May 2011

Supervisor: Dr. Kate Beard

The University of Maine

M.S., Spatial Information Science and Engineering

May 2009

Thesis: An Embedding Graph for 9-Intersection Topological Spatial Relations

Advisor: Max J. Egenhofer

The University of Maine

BA in Mathematics and Statistics

August 2007

Focus on Mathematical Statistics

EMPLOYMENT**Associate Professor of Data Science, Computer Information Systems, and Applied Mathematics**

University of Maine at Augusta College of Professional Studies, Augusta, ME

August 2016 - Present (promoted from Assistant Professor August 2022)

- Develop courses from scratch in Database Design, Database Management, Data Science, Data Visualization, Data Mining, R, SQL, Algorithms and Data Structures, Visual Basic, Microsoft Office, Java, Software Engineering, Interdisciplinary Studies, and Geography
 - Construct a new data science baccalaureate degree for the University of Maine System
 - Conduct research in spatial data science, equine data science, and electoral data science
 - Participate in the Maine Geospatial Institute and Emergency Management Committee
 - Serve on the research and scholarship faculty committee
 - Serve and chair the assessment faculty committee and the curriculum committee
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- Redesigned curriculum submission system
 - Administered Dean performance evaluations
 - Serve on the civic engagement steering committee
 - Serve on the intercollegiate and honors council
 - Serve on the faculty senate as Secretary and Vice President
 - Serve on system-wide Faculty Governance Council
 - Served on six faculty hiring committees (Cybersecurity, Communications, Computer Information Systems, Mathematics, Computer Information Systems, Music Technology)

External Graduate Faculty, Graduate Instructor, and Adjunct Professor

University of Maine, Orono, ME

January 2018 – Present

- Served on the Council of Faculty Fellows for the MS Data Science and Engineering Program
- Served on the PhD Advisory Committee for Colin Bosma (Candidate in Clinical Psychology)
- Appointed to External Graduate Faculty of the School of Computing and Information Science and Graduate School of Biomedical Science and Engineering
- Instructed BMS 625: Foundations of Biomedical Science and Engineering: Computational Biology and DSE 510: Data Science Practicum at the Graduate level
- Instructed GEO 100: World Geography, COS 120: Introduction to Programming, COS 121: Computing for Everyone, and COS 198: Data Visualization for Aspirations Program

Mathematics Instructor, Presentation Skills Instructor, Research Mentor, Group Project Coordinator

Upward Bound Math-Science Program, Orono, ME

June 2011 – Present

- Developed from scratch six-week intensive curricula for calculus, pre-calculus, statistics, geometry, and presentation skills courses
- Developed aspirations courses in data visualization (2018) and sensors (2019)
- Authored instruction manuals for calculus, pre-calculus, and statistics
- Mentored 3-5 students per program year through collegiate research experiences
- Trained fellow co-workers in statistical methodology to assist their research mentees, including experimental design, proper statistical test diagnosis, and statistical interpretation
- Implemented data science bootcamp experiences for 50-75 students

Teaching and Research Assistant

University of Maine School of Computing and Information Science, Orono, ME

May 2008 – May 2016

- Instructed service courses in Microsoft Excel
 - Lectured for classes in engineering databases, discrete structures, information systems, experimental design, and spatial reasoning
 - Graded assignments ranging from conceptual schema design, coding, to SQL
 - Developed real-world application lab assignments for concepts covered in courses
 - Mentored research for junior graduate students
 - Responded to student questions and needs for further clarification
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Teaching Assistant

University of Maine Department of Mathematics and Statistics, Orono, ME

January 2014 – May 2014

- Provided recitation material for three Calculus II sections
- Provided homework guidance for struggling students
- Developed examples of concepts applied in real world phenomena

IGERT Fellow

University of Maine Sensor Science, Engineering, and Informatics IGERT, Orono, ME

September 2009 – May 2011

- Developed client-motivated sensor solutions for indoor navigation in low-vision environments
- Participated in interdisciplinary coursework in sensor technologies
- Facilitated laboratory course for following cohort
- Advised following cohort through their client project: formaldehyde monitoring system

Assistant Training/Security Coordinator

University of Maine Office of Student Records

September 2007 – May 2009

- Developed and delivered training materials for system-wide implementation of MaineStreet academic management software
- Instituted standing SQL queries for academic personnel needs
- Developed out-of-system solutions for administrative staff needs in academic management
- Debugged and experimented with role combinations and modules within the new system

INSTRUCTED COURSES (INCLUDING AS TA)

University of Maine at Augusta (Assistant/Associate Professor)

Spring 2024 (scheduled)

CIS 150 – Introduction to Data Science (Online)

CIS 218 – Introduction to SQL (Online)

CIS/DSC 352/552 – Data Visualization (Online)

CIS/DSC 489/589 – Data Cleaning (Online)

POS 487 - Data and Research Literacy for Public Administration (Online)

Fall 2023

BUA/CIS/DSC/MAT/TEM 450/550 - Data Mining (Online) Enrolled: 9

CIS 150 - Introduction to Data Science (Online) Enrolled: 50

CIS 212 - Introduction to Visual Basic (Online) Enrolled: 10

CIS/DSC 255 - Database Design (Online) Enrolled: 20

GEO 101 - Introduction to Geography (Online) Enrolled: 17

Summer 2023

CIS 353 - Principles of Human-Computer Interaction and User Design (Online) Enrolled: 11

CIS 449 - R Programming and Package Development (Online) Enrolled: 15

Spring 2023

CIS 150 - Introduction to Data Science (Online)

CIS 218 - Introduction to SQL (Online)

CIS/DSC 255 - Database Design (Online)

CIS/DSC/INT/TEM 352/552 - Data Visualization (Online)
POS/TEM 487/587 - Data and Research Literacy for Public Administration (Online)

Fall 2022

BUA/CIS/DSC/MAT/TEM 450/550 - Data Mining (Online)
CIS 150 - Introduction to Data Science (Online)
CIS 212 - Introduction to Visual Basic (Online)
CIS/DSC 255 - Database Design (Online)
EDU 392 – Methods of Teaching Computer Science (Online)
GEO 101 - Introduction to Geography (Online)

Summer 2022

CIS 410 - Software Engineering (Online)
CIS 449 - R Programming and Package Development (Online)

Spring 2022

CIS 150 - Introduction to Data Science (Online)
CIS 218 - Introduction to SQL (Online)
CIS 353 - Principles of Human-Computer Interaction and User Design (Online)
CIS/DSC 255 - Database Design (Online)
CIS/DSC/INT/TEM 352/552 - Data Visualization (Online)
POS/TEM 487/587 - Data and Research Literacy for Public Administration (Online)

Fall 2021

BUA/CIS/DSC/MAT 450 – Data Mining (Live/Online)
CIS 100 – Introduction to Computer Applications (Live/Online)
CIS 150 – Introduction to Data Science (Online)
CIS 212 – Introduction to Visual Basic (Online)
CIS/DSC 255 – Database Design (Online)
GEO 101 – Introduction to Geography (Online)

Summer 2021

CIS 355 – Introduction to Sensors (Online) Enrolled 13
CIS 449 – R Programming and Package Development (Online) Enrolled 16
MAT 115 – Elementary Statistics I (Online) Enrolled 15

Spring 2021

CIS 100 – Introduction to Computer Applications (Live/Online) Enrolled: 17
CIS 218 – Introduction to SQL (Online) Enrolled: 18
CIS/DSC 255 – Database Design (Online) Enrolled: 11
CIS/DSC/INT 352 – Data Visualization (Online) Enrolled: 12
CIS 353 – Human Computer Interaction and User Design (Online) Enrolled: 10
POS 487 – Data and Research Literacy for Public Management (Online) Enrolled: 10

Fall 2020

BUA/CIS/DSC/MAT 450 – Data Mining (Online) Enrolled: 10
CIS 100 – Introduction to Computer Applications (Live/Online) Enrolled: 25
CIS 150 – Introduction to Data Science (Online) Enrolled: 16
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 20
CIS/DSC 255 – Database Design (Live/Online) Enrolled: 47
GEO 101 – Introduction to Geography (Online) Enrolled: 27

Summer 2020

CIS 410 – Software Engineering (Online) Enrolled: 15
CIS 449 – R Programming and Package Development (Online) Enrolled: 25
SSC 389 – Redistricting and the U.S. Census (Online) Enrolled: 2

Spring 2020

CIS 218 – Introduction to SQL (Online) Enrolled: 23
CIS 255 – Database Design (Live/Online) Enrolled: 42
CIS 352 – Data Visualization (Online) Enrolled: 17
CIS 353 – Human Computer Interaction and User Design (Live/Online) Enrolled: 13
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 9

Fall 2019

BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 10
CIS 100 – Introduction to Computer Applications (Live) Enrolled: 20
CIS 150 – Introduction to Data Science (Online) Enrolled: 10
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 20
CIS 218 – Introduction to SQL (Online) Enrolled: 1 (Directed Study)
CIS 255 – Database Design (Live/Online) Enrolled: 35
CIS 410 – Software Engineering (Online) Enrolled: 1 (Directed Study)
GEO 101 – Introduction to Geography (Live/Online) Enrolled: 20

Summer 2019

CIS 355 – Introduction to Sensation and Measurement Theory (Online) Enrolled: 11
CIS 449 – R Programming and Package Development (Online): Enrolled: 12

Spring 2019

CIS 100 – Introduction to Computer Applications (Live) Enrolled: 24
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 2 (Directed Study)
CIS 218 – Introduction to SQL (Online) Enrolled: 26
CIS 255 – Database Design (Live/Online) Enrolled: 24
CIS 312 – Advanced Visual Basic (Online) Enrolled: 1 (Directed Study)
CIS 352 – Data Visualization (Online) Enrolled: 9
CIS 353 – Human Computer Interaction and User Design (Live/Online) Enrolled: 9
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 9
CIS 449 – R Programming and Package Development (Online) Enrolled: 1 (Directed Study)

Fall 2018

BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 8
CIS 150 – Introduction to Data Science (Online) Enrolled: 5
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 24
CIS 255 – Database Design (Live/Online) Enrolled: 47
CIS 353 – Human Computer Interaction and User Design (Online) Enrolled: 2 (Directed Study)
CIS 410 – Introduction to Software Engineering (Online) Enrolled: 3
INT 208 – Introduction to Interdisciplinary Studies (Live/Online) Enrolled: 10

Summer 2018

CIS 352 – Data Visualization (Online) Enrolled: 3 (Directed Study)
CIS 353 – Human Computer Interaction and User Design (Online) Enrolled: 13
CIS 380/480 – Internship (Online) Enrolled: 6 (Directed Study)

Spring 2018

CIS 100 – Introduction to Computer Applications (Live) Enrolled: 22
CIS 255 – Database Design (Live/Online) Enrolled: 45
CIS 312 – Advanced Visual Basic (Online) Enrolled: 4
CIS 314 – Advanced Java (Live/Online) Enrolled: 8
CIS 352 – Data Visualization (Online) Enrolled: 19
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 1 (Directed Study)
CIS 449 – R Programming and Package Development (Online) Enrolled: 12

Fall 2017

BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 11
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 15
CIS 255 – Database Design (Live/Online) Enrolled: 59
CIS 350 – Database Management (Live/Online) Enrolled: 9
CIS 354 – Algorithms and Data Structures (Live/Online) Enrolled: 13

Summer 2017

CIS 135 – Introduction to Information Systems (Online) Enrolled: 24
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 1 (Directed Study)
CIS 255 – Database Design (Online) Enrolled: 1 (Directed Study)

Spring 2017

CIS 100 (2 sections) – Introduction to Computer Applications (Live) Enrolled: 24 (Online)
Enrolled: 33
CIS 255 – Database Design (Live/Online) Enrolled: 44
CIS 312 – Advanced Visual Basic (Online) Enrolled: 12
CIS 352 – Data Visualization (Online) Enrolled: 2 (Directed Study)

Fall 2016

CIS 100 – Introduction to Computer Applications (Live) Enrolled: 22
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 16
CIS 350 – Database Management (Live/Online) Enrolled: 28

University of Maine (Adjunct Professor, Teaching Assistant)

Spring 2024 (Scheduled)

BMS 625 - Foundations of Biostatistics and Computational Biology (Instructor of Record)
DSE 510 - Data Science Practicum (Instructor of Record)

Fall 2023

DSE 501 - Mathematical Foundations for Data Science (Instructor of Record)

Summer 2023

GEO/HTY 265 – Power of Maps (Instructor of Record)

Spring 2023

BMS 625 - Foundations of Biostatistics and Computational Biology (Instructor of Record)
DSE 510 - Data Science Practicum (Instructor of Record)

Summer 2022

Fall 2021

BMS 625 – Foundations of Biostatistics and Computational Biology (Instructor of Record)

Fall 2020

BMS 625 – Foundations of Biostatistics and Computational Biology (Instructor of Record) Enrolled: 25

Summer 2020

GEO 100 – World Geography (Instructor of Record) Enrolled: 7

Fall 2019

BMS 625 – Foundations of Biostatistics and Computational Biology (Instructor of Record) Enrolled: 18

Summer 2019

COS 120 – Introduction to Computer Programming (Instructor of Record) Enrolled: 11

Summer 2018

COS 198 – Data Visualization (Instructor of Record) Enrolled: 18

Spring 2016

COS 213 – Advanced Excel Spreadsheet Design (Instructor of Record) Enrolled: 98

Fall 2015

COS 213 – Advanced Excel Spreadsheet Design (Instructor of Record) Enrolled: 93
COS 250 – Discrete Structures (TA) (Dr. Torsten Hahmann)

Spring 2014

MAT 127 – Calculus II (TA) (Paula Drewniany)
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Summer 2013

POS 498 – Mathematics of Redistricting (TA) (Dr. Richard Powell)

Fall 2013

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2013

SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2012

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2012

SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2011

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2011

ECO 493 – Calculus for Economics (TA) (Dr. George Criner)
INT 598 – Sensor Testbed (Advisor) (Dr. Kate Beard)

SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2010

INT 598 – Sensor Foundations (Lab Instructor) (Dr. Kate Beard)

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2010

BUA 490 – Leadership for the Future (TA) (Dr. Scott Anchors)

SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2009

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2009

SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2008

SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Upward Bound Math-Science

Bridge Seminar – 2016, 2017, 2018, 2019, 2020

Calculus – 2012, 2013, 2014

Cartography - 2023

Computer Programming – 2019, 2022

Data Visualization – 2018

Geography – 2020

Geometry – 2014

Pre-Calculus – 2011

Presentation Seminar – 2013, 2014, 2015

Statistics – 2013, 2014, 2015, 2021

PUBLICATIONS

Journal Articles

Dube, M. & R. Graziano (2023) "Identification: A Teaching Moment for Privacy and Databases." *ACM EngageCSEDU* (in press)

Claramunt, C. & **M. Dube** (2023) "A Brief Review of the Evolution of GIScience since the NCGIA Research Initiatives." *Journal of Spatial Information Science* 26(1), 137-150.

Gleason, K., **M. Dube**, J. Martin, E. Bernier, & J. Gipson (2023) "Rural Housing Insecurity: A Case Study Comparison Across Four Rural Areas in Maine." *Journal of Ethnographic and Qualitative Research* 17(1), 39-57.

Hebert-Dufresne, L., T. Waring, G. St. Onge, M. Niles, S. Miller, L. Corlew, **M. Dube**, N. Gotelli, & B. McGill (2022) "Source-sink Cooperation Dynamics Limit Institutional Evolution in a Group-structured Society." *Royal Society Open Science* 9(3), 211743

Gleason, K., **M. Dube**, E. Bernier, & J. Martin (2022) "Using Geographic Information Systems to Assess Community-Level Vulnerability to Housing Insecurity in Rural Areas." *Journal of Community Psychology* 50(4), 1993-2012

Dube, M., J. Clark, & R. Powell (2022) "Graphical Metrics for Analyzing District Maps." *Journal of Computational Social Science* 5(1), 449-475

Dube, M. (2021) "Deriving Topological Relations from Topologically Augmented Direction Relation Matrices." *Journal of Spatial Information Science* 23(1), 1-23

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- Powell, R., J. Clark, & **M. Dube** (2020) "Partisan Gerrymandering, Clustering, or Both? A New Approach to a Persistent Question." *Election Law Journal* 19(1): 1-22.
- Dube, M.** & M. Egenhofer. (2020) "Binary Topological Relations on the Digital Sphere." *International Journal of Approximate Reasoning* 116(1): 62-83.
- Dube, M.**, M. Egenhofer, J. Barrett, & N. Simpson. (2019) "Beyond the Digital Jordan Curve: Unconstrained Simple Pixel-Based Raster Relations." *Journal of Computer Languages* 54(1): 100906
- Poulin, A., M. Hutchinson, **M. Dube**, M. Stokes, S. Mitchell, A. Edwards, K. Harvey, A. Myer, & R. Causey (2018). "Abatement of Streptococcus Equi in Soiled Equine Bedding and Compost." *Journal of Equine Veterinary Science* 70(1): 117-122.
- Dube, M.**, D. Pacciamonti, L. Underhill, & R. Causey (2018). "Differences in Foaling Rates of Thoroughbred Mares with Different Histories." *Journal of Equine Veterinary Science* 66(1): 246.
- Dube, M.** (2017) "Topological Augmentation: A Step Forward for Qualitative Spatial Partition Reasoning." *Journal of Spatial Information Science* 14(1): 1-29.

Book Chapters

- Clark, J., **M. Dube**, & R. Powell. (2020) "Stemming the Tide: The Impact of Redistricting on the 2018 Midterm Election." In: *The Unforeseen Impacts of the 2018 Midterms*. T.S. Sisco, J.C. Lucas, & C.J. Galdieri (eds.), Palgrave Pivot, 7-40.
- Dube, M.** (2016) "Beyond Homeomorphic Deformations: Neighborhoods of Topological Change." *Advancing Geographic Information Science: The Past and Next Twenty Years*, H. Onsrud & W. Kuhn (eds.), GSDI Association Press, 137-152.

Fully Refereed Conference Proceedings

- Dube, M.**, J. Barrett, & M. Egenhofer. (2015) "From Metric to Topology: Determining Relations in Discrete Space." *Conference on Spatial Information Theory*, Santa Fe, NM. S. Fabrikant, M. Raubal, M. Bertolotto, C. Davis, S. Bell, & S. Freundschuh (eds.), *Lecture Notes in Computer Science 9368* 151-171.
- Dube, M.**, M. Egenhofer, J. Lewis, S. Stephen, & M. Plummer. (2015) "Swiss Canton Regions: A Model for Complex Regions in Geographic Partitions." *Conference on Spatial Information Theory*, Santa Fe, NM. S. Fabrikant, M. Raubal, M. Bertolotto, C. Davis, S. Bell, & S. Freundschuh (eds.), *Lecture Notes in Computer Science 9368* 309-330.
- Dube, M.** & M. Egenhofer. (2014) "Surrounds in Partitions." *22nd ACM SIGSPATIAL 2014 GIS*, Dallas, TX. Y. Huang, M. Schneider, M. Gertz, J. Krumm, & J. Sankaranarayanan (eds.), *ACM Press*, 233-242.
- Lewis, J., **M. Dube**, & M. Egenhofer. (2013) "The Topology of Spatial Scenes in R^2 ." *Conference on Spatial Information Theory*, Scarborough, United Kingdom. A. Galton, B. Bennett, T. Tenbrink, & Z. Wood (eds.), *Lecture Notes in Computer Science 8116*, 495-515.
- Dube, M.** & M. Egenhofer. (2012) "An Ordering of Convex Topological Relations." *GIScience 2012*, Columbus, OH. N. Xiao, M. Kwan, M. Goodchild, & S. Shekhar (eds.), *Lecture Notes in Computer Science 7478*, 72-86.
- Egenhofer, M. & **M. Dube**. (2009) "Topological Relations from Metric Refinements." *17th ACM SIGSPATIAL 2009 GIS*, Seattle, WA. D. Agrawal, W. Aref, C. Lu, M. Mokbel, P. Scheuermann, C. Shahabi, & O. Wolfson (eds.), *ACM Press*, 158-167.
- Dube, M.** & M. Egenhofer. (2009) "Establishing Similarity Across Multi-Granular Topological-Spatial Relation Ontologies." *QuaCon 2009 – First International Workshop on Quality of Context*, Stuttgart, Germany. D. Fritsch & K. Rothermel (eds.), *Lecture Notes in Computer Science 5786*, 98-108.

Abstract-Refereed Conference Presentations

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- Corlew, L., M. Brunton, P. Burnham, **M. Dube**, E. Espinosa, N. Gotelli, L. Hebert-Dufresne, M. Kling, B. McGill, B. McLaughlin, S. Miller, M. Niles, & T. Waring. (2023) "Using Narrative to Communicate Epistemic Uncertainty in Climate Change Data." *2023 Society for Community Research and Action Biennial*, June, 2023.
- Bellaire, E., K. Harrison, L. Heald, V. Ireland, & **M. Dube** (2022) "Studying Shifting Standards in Nursing" (working title) *UMS Nursing Research Conference*, November, 2022
- Burnham, P., L. Corlew, **M. Dube**, Q. Dubois, E. Espinosa, N. Gotelli, L. Hebert-Dufresne, M. Kling, B. McGill, B. McLaughlin, S. Miller, & M. Niles. (2022) "BARRACUDA: Rural Adaptation to Climate Change." *Ecological Society of America and Canadian Society for Ecology and Evolution Joint Meeting*, August, 2022
- Dube, M.** & N. Gotelli. (2021) "Extra-Disciplinary Data Science Boot Camp." *National Data Science Education Workshop*, June, 2021
- Gleason, K. & **M. Dube**. (2019) "Geographic Needs Assessment for Rural Homeless Services in Maine." *Society for Community Research and Action 2019 Biennial* June 2019
- Honda, H., T. Surette, & **M. Dube**. (2018). "Assessing and Improving Vocational Relevance in Professional Studies." *New England Educational Assessment Network Fall Forum*, Worcester, MA, November 2018.
- Powell, R., J. Clark, & **M. Dube**. (2017) "Assessing the Causes of District Homogeneity in U.S. House Elections." American Political Science Association, San Francisco, CA, August, 2017.
- Powell, R., **M. Dube**, & J. Clark. (2017) "Mathematical Characteristics of District Boundary Lines as Indicators of Partisan Gerrymandering in U.S. House Elections." *Midwest Political Science Association Conference*, Chicago, IL, April, 2017.
- Dube, M.** & J. Clark. (2016) "Beyond the Circle: Measuring District Compactness Using Graph Theory." *Northeast Political Science Association Conference*, Boston, MA, November, 2016.
- Powell, R., J. Clark, & **M. Dube**. (2015) "Determining an Expected House Majority through Pattern Analysis." *Northeast Political Science Association Conference*, Philadelphia, PA, November, 2015.
- Dube, M.** (2014) "Partitions to Improve Spatial Reasoning." *1st ACM SIGSPATIAL Ph.D. Symposium*, Dallas, TX, November, 2014.

Symposia Organized

- Richardson, J., P. Cunningham, **M. Dube**, D. Farrell, C. Manderson, J. Normandin, R. Schaffner, A. Smith-Peterson, & L. Teisl. Maine GIS User Group Annual Conference, Freeport, ME, November, 2023.
- Gleason, K., **M. Dube**, J. Martin, E. Bernier, & J. Gipson. "Housing as a Social Determinant of Health: The Importance of Recognizing Housing as a Context for Individual and Community Wellness." *Society for Community Research and Action Biennial*, Atlanta, GA, June, 2023.
- Richardson, J., P. Cunningham, **M. Dube**, D. Farrell, C. Manderson, J. Normandin, R. Schaffner, A. Smith-Peterson, & L. Teisl. Maine GIS User Group Mini-Conference, Augusta, ME, May, 2023.
- Dube, M.**, P. Cunningham, J. Normandin, R. Schaffner, A. Smith-Peterson, L. Teisl, & T. Youngs. Maine GIS User Group Annual Conference, Belfast, ME, October 2022.
- Dube, M.**, P. Cunningham, J. Normandin, R. Schaffner, A. Smith-Peterson, L. Teisl, & T. Youngs. Maine GIS User Group Drone Mini-Conference, Brunswick, ME, May, 2022.
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RESEARCH SUPERVISED

University of Maine

Supervisor

- University of Maine Master of Science Advisor – Aminah Aleem (PSMS, Bioinformatics (May 2023 – present))
- University of Maine Master of Science Advisor – Amay Dankar (PSMS, Bioinformatics) (May 2023 – present)
- University of Maine Master of Science Advisor – Brenden Wood (MS, Data Science and Engineering) (May 2023 – present)
- University of Maine Master of Science Advisor – Kevin Roberge (MS, Data Science and Engineering) (May 2023 – present)
- University of Maine Master of Science Advisor - Brendan Hall (MS, Spatial Information Science and Engineering) (September 2022 - present)
- University of Maine Master of Science Advisor - Estevan Garcia (MS, Data Science and Engineering) (September 2021 - present)
- University of Maine Master of Science Advisor - Jonathan Parsons (MS, Data Science and Engineering) (September 2021 - August 2023) – *Portsmouth Naval Shipyard*
- Determining an Expected House Majority Using Pattern Analysis^{1*} – Jesse Clark (Honors Thesis Co-Advisor, 2015-2016) – *Ph.D. Political Science, Massachusetts Institute of Technology - Senior Data Science Associate, Bully Pulpit Interactive*

Committee

- University of Maine Master of Science Committee Member - Thunendran Periyandy - (M.S. Spatial Information Science and Engineering) (September 2022 - April 2023)
- University of Maine Doctoral Dissertation Committee Member – Colin Bosma (Ph.D. Clinical Psychology) (January 2019 – May 2021) - *Licensed Psychologist, Providence Health and Services*
- The Effects of Racing Surface and Turn Radius on the Occurrence of Front Limb Injuries in Thoroughbred Race Horses from 2009-2012^{2**} – Chelbie Aube (Animal and Veterinary Science Capstone, 2014-2015)
- The Effects of Racing Surface on the Occurrence of Hind Limb Injuries in Thoroughbred Race Horses from 2009-2012 – Jordanne Woodbury^{**} (Animal and Veterinary Science Capstone, 2014-2015)

Upward Bound Math-Science

- Predicting the Redistricting of 2020 and 2030 – Garrett Caruso (2019) – *attending the University of Maine for B.S. Computer Science*
- The Correlation between the Period of Sound Waves and Galvanic Skin Response (GSR) Readings – William Curtis (2019) – *Graduate of Mattanawcook Academy*
- A Study on the Behaviors Exhibited by the Composition Operator in Context of Topological-Spatial Relations between Lines and Regions – Cody Norris (2019) – *attended the University of Maine for B.S. Computer Science*
- Spectral Interference? Optimal Light Settings for Colour Sensor Calibration – Nickolas Millett (2019) – *attending the University of Maine for B.S. Computer Science*
- The Impact of a Horse's Age and Sex on Start Lag Intervals – Lauren Underhill (2018) – *attending the University of Maine at Augusta for B.S. Veterinary Technology*

^{1*} Accepted to *Northeast Political Science Association Conference*

^{2**} Submitted to journal

Confirming the Efficacy of Even Swing through the Use of Election Data – Kyle Watson (2018) – *attending Princeton University for B.S. Engineering*

Man vs. Machine: Who is Better at Making Competitive Congressional Districts? – Cody Hall (2017) – *attended Husson University for B.S. Entertainment Production*

Relative Strength of Shape, Size, Color, Saturation, and Motion as Visual Preattentive Attributes in Adolescents – Jarek Munson (2017) – *attended Nokomis Regional High*

The Effect of Age and Breeding History on Thoroughbred Foaling^{3***} – Lauren Underhill (2017) – *attending the University of Maine at Augusta for B.S. Veterinary Technology*

Perception of Rotational Motion: The Influence of Control and Goal on Angular Accuracy – Cody Hall (2016) – *attended Husson University for B.S. Entertainment Production*

Perception Bias in Interpersonal Relationships based on Personality Types – Krystina Martinez (2016) – *attended Nokomis Regional High*

The Impact of Social Heterogeneity on Workplace Performance – Maryan Mukhtar (2016) – *attending Southern Maine Community College*

A Graph Theory and Statistics Approach to Gerrymander Identification – Garrett Rudge (2016) – *attended the University of Maine for B.A. Mathematics and Statistics*

Human Preference and its Influence on Canine Adoption Rates – Joseph Buzzell (2015) – *attending Atlantic Veterinary College for DVM*

Determining Missing Letters through Sequential Analysis – Jason Lewis (2015) – *attended Thomas College for B.S. in Computer Science*

Determining Effectiveness of a National Election Prediction Model – Maryan Mukhtar (2015) – *attending Southern Maine Community College*

Correlations between StrengthsFinder Assessment Strengths in UBMS Population – Kaylynn Rice (2015) – *attended Nokomis Regional High*

Raster Relations for Connected Regions^{4****} – Noah Simpson (2015) – *attended the University of Maine for Pre-Engineering*

Determining Topological Relations between Digital 3D Objects^{5*****} – Jordan Barrett (2014) – *attending University of Nebraska for Ph.D. in Mathematics*

Partitioning New England to Represent Republican Populations – Justin Chan (2014) – *attended Northeastern University for B.A. Political Science*

Discrimination of Equally Tempered Tones and Chords – Beverley Guay (2014) – *attended College of the Atlantic for B.S. Environmental Science*

Raster Relations Revisited: Expanding Spatial Possibilities through Constraint Relaxation – Noah Simpson (2014) – *attended the University of Maine for Pre-Engineering*

Solving Hydroelectricity's Fish Problem – Marianna Angelo, Breanna Batchelder, Jonathan Haddad, Austin Nantkes, Joshua Wheeler, and Caleb Wursten (2013) – *attending/attended the University of Maine (B.S. Mechanical Engineering), Colby College (B.S. Computer Science), Husson University (B.S. Physical Therapy), Babson College (B.S. Business and Entrepreneurship)*

Identifying Viable Symbols within 3D Qualitative Direction Partitions – Jordan Barrett (2013) – *attending University of Nebraska for Ph.D. in Mathematics*

Merit of the Judging/Perceiving Pole – Courtney Burriss (2013) – *attending University of Buffalo for Ph.D. Industrial Systems Engineering*

Identifying Languages based on Conditional Probability and Frequency Distribution – Mia Campbell (2013) – *attended Bangor High School*

Detectability Levels of the Human Ear: Using a Range of Frequencies, Octaves, and Tones – Beverley Guay (2013) – *attended College of the Atlantic for B.S. Environmental Science*

Biocapacity: The Earth's Natural Countdown – Odom Lim (2013) – *attended Massachusetts College of Pharmacy*

^{3***} Accepted to *International Symposium on Equine Reproduction (ISER)*

^{4****} Accepted to *Journal of Computer Languages*

^{5*****} Accepted to *International Conference on Spatial Information Theory (COSIT)*

and Health Sciences for Pharm. D.

Exploring the Methods of Differential Calculus through the Brachistichrone Problem – Courtney Burriss (2012) – *attending University of Buffalo for Ph.D. Industrial Systems Engineering*

Of Ecology and Climate Change: Past, Present, and Future – Jordan Barrett, Stephanie Decker, Dustin Ewer, Patrick Nason, and Labiba Shaheed (2012) – *attended or attending the University of Maine (B.S. Clinical Lab Sciences, B.S. Social Work), University of Massachusetts-Lowell (B.S. Biology), University of Nebraska (Ph.D. Mathematics)*

The Gerrymandered States of America: An Attempt to Reverse the Election of 2008 in Favor of the Minority Candidate – Odom Lim (2012) -- *attended Massachusetts College of Pharmacy and Health Sciences for Pharm. D.*

An Algorithm for Determining Convexity within an Arbitrary Network^{6*****} – Brian Lopez-Cornier (2011) – *attended University of Massachusetts-Boston for B.S. Computer Forensics*

Using Taylor Series to Approximate an Indefinite Integral (Anti-derivative) - Chhing Tiv (2011) – *attended University of Massachusetts-Amherst for B.S. Psychology*

FUNDING

“Adult Transitions, Learning, and Success” – University of Maine Adult Learning Grant (Co-Principal Investigator) - \$10,000 (2021)

“Extra-Disciplinary Data Science Boot Camp” – CUE.NEXT, National Science Foundation (Subaward) - \$12,000 (2021)

“Harnessing Spatiotemporal Data Science to Predict Responses of Biodiversity and Rural Communities under Climate Change” - EPSCoR Track II, National Science Foundation (Co-Principal Investigator) - \$3,995,366 (2020)

“BS Data Science Degree” – UMS Collaborative Program Support Fund (Curriculum Author) - \$177,177 (2018)

“How do Adult Students Relate their Academic Studies with their Work Experiences and Career Aspirations” – Presidential Research Innovation Grant, University of Maine at Augusta (Co-Investigator) - \$10,570 (2017)

Total: \$4,205,113

SERVICE

Campus Service

University of Maine System Faculty Governance Council (September 2022 – present, Co-Chair 2023-present)

University of Maine at Augusta Policy Scholars Joint Advisor (October 2018 – present)

University of Maine at Augusta Faculty Senate (October 2017 – present; Secretary June 2018 – 2022, Vice President 2022-2023)

University of Maine at Augusta Curriculum Committee Member (September 2019 – present, Chair 2019-2023)

University of Maine at Augusta Intercollegiate Honors Council Member (February 2017 – present)

University of Maine at Augusta Music Technology Hiring Committee Member (2022-2023 AY)

University of Maine at Augusta Computer Information Systems Hiring Committee Member (2022-2023 AY)

University of Maine at Augusta Mathematics Hiring Committee Member (2022-2023 AY)

^{6*****} Accepted to *International Conference on Geographic Information Science (GIScience)*

University of Maine at Augusta Data Science Hiring Committee Member (2022-2023 AY)
University of Maine at Augusta Presidential Search Committee Member (2021-2022 AY)
University of Maine at Augusta Data Science Hiring Committee Member (2018-2019 AY)
University of Maine at Augusta Communications Hiring Committee Member (2018-2019 AY)
University of Maine TRiO Upward Bound Math-Science Academic Coordinator Hiring Committee Member (2017-2018 AY)
University of Maine at Augusta Cybersecurity Hiring Committee Member (2017-2018 AY)
University of Maine at Augusta Assessment Committee Member (September 2017 – May 2019; Chair June 2018 – May 2019)
University of Maine at Augusta Advocating Wicked Scholarship in Maine Committee Member (August 2016 – May 2018)

Scholarly Service

NSF Review Panelist - 2022, 2023
Treasurer of Maine Geospatial Institute – 2019 - present
Travel Coordinator for the 2011 Conference on Spatial Information Theory – 2011
Reviewer for many international journals and conferences, including *International Journal of Geographical Information Science*, *Journal of Visual Languages and Computing*, *Journal of Spatial Information Science*, *Future Generation Computer Systems*, *International Journal of Geo-Information*, *Journal of Knowledge and Information Systems*, *Computers, Environments, and Urban Systems*, *Conference on Spatial Information Theory*, and *Geographic Information Science*, *Commonwealth: A Journal of Pennsylvania Politics and Policy*, *Journal of Geographical Systems*

Public Service

Holocaust and Human Rights Center of Maine External Reviewer - 2022 - present
Higher Education Representative, Maine Computer Science Teachers Association - 2021 - present
Education Chair, Maine GIS Users Group – 2020 – 2021; Vice Chair 2021-2022; Chair 2022-present
Education and Training Chair, Maine Geolibraries Board – 2020 – present
Young Professionals Chair, IEEE Region 1 (Maine) – 2021 – 2022

Student Organizations

Education Subcommittee Chair, Sigma Phi Epsilon Ritual Task Force - 2021 - present
Alternative Breaks Trip Advisor – 2008 – 2016, 2018 – present
Chapter Counselor, Maine Alpha Chapter of Sigma Phi Epsilon – 2013 – present
Sigma Phi Epsilon Carlson Leadership Academy Faculty, Northeast Region – 2012 - 2014, 2020 (Finance, Leadership, Chaplain)
Balanced Man Steward, Maine Alpha Chapter of Sigma Phi Epsilon – 2009 – 2013
Vice President of Alumni Relations, Maine Alpha Alumni and Volunteer Corporation – 2007 – 2009

CONFERENCES ATTENDED

National Data Science Education Workshop – Berkeley, CA (June 2023)
Society for Community Research and Action Biennial – Atlanta, GA (June 2023)
UMS Nursing Research Conference – Augusta, ME (November 2022)
Ecological Society of America and Canadian Society for Ecology and Evolution Joint Meeting – Montreal, PQ (August 2022)
National Data Science Education Workshop – Berkeley, CA (June 2022)
Maine Educational Opportunity Alliance TRiO Advocacy Workshop– Augusta, ME (March 2022)

Maine STEM+C Middle School Educators Workshop – Orono, ME (July 2021)
Institute on Project-Based Learning – Worcester, MA (June 2021)
National Data Science Education Workshop – Berkeley, CA (June 2021)
Worcester Polytechnic Institute Project-Based Learning Institute – Worcester, MA (June 2021)
ESRI User Conference – San Diego, CA (July 2020)
National Data Science Education Workshop – Berkeley, CA (June 2020)
Worcester Polytechnic Institute Project-Based Learning Institute – Worcester, MA (June 2020)
MELMAC 2020 – Orono, ME (February 2020)
CUE.NEXT: Envisioning the Future of Undergraduate Computer Science Education – Denver, CO
(January 2020)
Census and Electoral Geospatial Data – Boston, MA (November 2019)
Society for Community Research and Action Biennial – Chicago, IL (June 2019)
American Elections Symposium – Manchester, NH (March 2019)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2019)
New England Educational Assessment Network Fall Forum – Worcester, MA (November 2018)
International Symposium on Equine Reproduction XII – Cambridge, UK (July 2018)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2018)
The International Emergency Management Society USA Meeting – Orono, ME (June 2017)
Midwest Political Science Association – Chicago, IL (April 2017)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2017)
International Conference on Spatial Information Theory – Santa Fe, NM (October 2015)
Advancing Geographic Information Science: The Past and Next Twenty Years – Bar Harbor, ME (June
2015)
ACM SIGSPATIAL – Dallas, TX (November 2014)
International Conference on Spatial Information Theory – Scarborough, UK (September 2013)
Geographic Information Science – Columbus, OH (September 2012)
International Conference on Spatial Information Theory – Belfast, ME (October 2011)
ACM SIGSPATIAL – Seattle, WA (November 2009)
Quality of Context – Stuttgart, Germany (June 2009)

INVITED LECTURES

Understanding the Seeds of Spatial Poverty (Keynote Address) – *Maine Resiliency Building Network*, Orono,
ME (April 2021)
Glory, Glory Pareidolia: A Method for Addressing Gerrymandering using Topological rather than
Geometric Means. *Maine GIS Users Group Lunch and Learn Series*, Augusta, ME (February 2021)
Glory, Glory Pareidolia: A Method for Addressing Gerrymandering using Topological rather than
Geometric Means. *Spatial Data Science Institute*, Orono, ME (March 2020)
Understanding the Seeds of Spatial Poverty (Keynote Address). *MELMAC Annual Meeting*, Orono, ME
(February 2020)
The Spatial Nature of Poverty and Educational Gaps. *Maine Educational Opportunity Association Conference*,
Orono, ME (January 2019)
The Role of Computer Science in Solving Governmental Issues Surrounding Redistricting – Bowdoin
College (October 2018)
The State of Affairs in Federal and State Redistricting Processes – WERU Community Radio (March 2018)
A Data Scientist's View on Sensation and Perception – The University of Maine (October 2017)
Data and the Quest for Truth – The University of Maine at Augusta Convocation Faculty Address
(September 2017)
Data Science in an Emergency Management Setting – The International Emergency Management Society
USA Meeting (June 2017)
Swiss Canton Regions: Defining an Object Model for Complex Spatial Objects – The University of Maine

(February 2017)

A Data Scientist's View on Sensation and Perception – The University of Maine (October 2016)

60 in 60: Life Lessons from Mathematics – Computer Science Education Week, The University of Maine
(December 2011)

PROFESSIONAL DEVELOPMENT

MBTI Certified Practitioner, GS Consultants (2022)

Data Storytelling, Purdue University Certificate (2021)

Enhancing Online Learning through Community-Based Learning, Campus Compact Fusion Course (2020)

User Experience Design, University of Cape Town Short Course (2020)

Artificial Intelligence: Implications for Business Strategy, Massachusetts Institute of Technology Short
Course (2020)

Project Management Certificate, University of Maine at Presque Isle (2011)

AWARDS AND HONORS

Research, Teaching, and Academic Awards

Distinguished Scholar Award – September 2019, presented by the administration of the University of
Maine at Augusta

Faculty Member of the Month – September 2015, presented by the sisters of the Maine Alpha Chapter of
Pi Beta Phi Sorority

Vespucci Initiative Top Mock Research Grant Proposal – July 2015, Vespucci Initiative, Bar Harbor,
Maine

Advancing Geographic Information Science: The Past and Next Twenty Years Junior Scholar – July, 2015,
Vespucci Initiative, Bar Harbor, Maine

Michael J. Eckardt Doctoral Dissertation Fellowship – August 2014 – August 2015, University of Maine,
Orono, Maine

NSF Travel Scholarship for ACM SIGSPATIAL – November 2014, Dallas, Texas

COST Young Researchers Forum – Moving Objects and Knowledge Representation, August 2011,
University of Ghent, Ghent, Belgium

NSF Integrated Graduate Education and Research Trainee – September 2009 – May 2011, University of
Maine, Orono, Maine

Top Graduate Award – May 2009, Department of Spatial Information Science and Engineering, University
of Maine, Orono, Maine

Mentoring and Service Honors

Distinguished Alumnus Award – 2021, Sigma Phi Epsilon Fraternity, Richmond, Virginia

Michael Morin Award for Fraternity Advisor of the Year – 2021, University of Maine, Orono, Maine

Michael Morin Award for Fraternity Advisor of the Year – 2020, University of Maine, Orono, Maine

Michael Morin Award for Fraternity Advisor of the Year – 2019, University of Maine, Orono, Maine

University of Maine at Augusta Faculty Gardener of the Year – 2018, University of Maine at Augusta,
Augusta, Maine

University of Maine at Augusta Faculty Gardener of the Year – 2017, University of Maine at Augusta,
Augusta, Maine

Distinguished Volunteer Award – 2016, Sigma Phi Epsilon Fraternity, Richmond, Virginia

Michael Morin Award for Fraternity Advisor of the Year – 2015, University of Maine, Orono, Maine

Michael Morin Award for Fraternity Advisor of the Year – 2014, University of Maine, Orono, Maine

All Maine Women Honor Society Distinguished Mentor Award (Kate McKeown) – April 2014, University of Maine, Orono, Maine
Nominee for the Dean Lucy Award – April 2009, University of Maine, Orono, Maine

MEMBERSHIPS

Professional

ACM

ACM Special Interest Group in Spatial Information Science and GIS

Computer Science Teachers Association

IEEE

Maine Computer Science Teachers Association

Maine Geolibraries Board

Maine Geospatial Institute

Maine GIS Users Group

Midwest Political Science Association

Honor Societies

Golden Key International Honor Society

Order of Omega

Pi Mu Epsilon National Honorary Mathematics Society – Maine Alpha Chapter

Phi Beta Kappa Society – Delta of Maine
