

Proceedings of the Midwest Instruction and Computing Symposium



April 06–07, 2018
The College of St Scholastica
Department of Computer Science

www.micsymposium.org/mics2018



MICS Mission

The **Midwest Instruction and Computing Symposium (MICS)** is a regional conference dedicated to providing an educational experience to higher education participants across the five-state region of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin. The conference focuses on integrating computer-based technology into teaching and learning processes of all disciplines, along with incorporating the study of this technology into the curriculum. Conference activities include technical paper sessions, programming and robotics contests, a keynote address, and a Career Fair for student participants.

Keynote Speaker

*Robots everywhere! Artificial Intelligence everywhere!
What will the future be?*

Dr. Maria Gini

**Department of Computer Science and Engineering
University of Minnesota**

Artificial Intelligence has made incredible progress in the last few years and is reaching the point where it has the potential to impact society in major ways. In the future intelligent systems and robots will become part of our daily lives, helping us with routine tasks, handling dangerous jobs, and keeping us company. However, they could also become capable of making decisions that violate our ethical principles, take control of our lives, and disrupt society. In this talk we will explore the state of the art in intelligent systems and discuss future developments and open challenges.



Dr. Maria Gini is a Professor in the Department of Computer Science and Engineering at the University of Minnesota. She develops algorithms that allow robots to decide how to allocate tasks among themselves, explore unknown environments, work as a team in search and rescue operations, or navigate in dense crowds. She has published more than 50 journal articles, and more than 250 conference papers and book chapters.

Dr. Gini is a Fellow of the Association for the Advancement of Artificial Intelligence, a Distinguished Professor of the College of Science and Engineering at the University of Minnesota, and the winner of numerous University awards. She is Editor in Chief of *Robotics and Autonomous Systems*, and is on the editorial board of numerous journals, including *Artificial Intelligence* and *Autonomous Agents and Multi-Agent Systems*. She has a special passion for increasing the number of women and students from underrepresented groups in computer science.

Science 1104**Theme: Mobile Apps****Session Chair: Sayeed Sajal**

12:45 PM	Ahmed El-Saied and Wen-Chen Hu	A Location-based Service Using a Server-Side Geographical Database
1:15 PM	Drew Klein	The Application of Concepts from Multiple Courses in Creating a Useful App for the University
1:45 PM	Benjamin Zwiener	Mobile SuDoku Harvesting App

Science 1109**Theme: K-12 Education****Session Chair: Mark Fienup**

12:45 PM	Kendall Nygard, Krishna Kambhampaty, Md., Minhaz Chowdhury and Damian Lampi	Cybersecurity Materials for K-12 Education
1:15 PM	Peter Peterson, Jon Beaulieu, Mazin Jindeel, Aleksandar Straumann and Brandon Paulsen	UMDCYL and Little Python: Teaching Coding by Playing Games
1:45 PM	Jennifer Rosato, Chery Lucarelli and Jill Long	Computational Thinking for All Pre-Service Teachers

Science 1127**Theme: Machine Learning & Image Processing****Session Chair: Anne Denton**

12:45 PM	Ashby Mullin	Using Deep Learning to Examine the Classification of Historical Data Through Neural Networks: The Sudoku Puzzle
1:15 PM	Alexander Pauls and Josiah Yoder	Exploring Optimum Drop-out Rate for Classic Neural Networks
1:45 PM	Jordan Goetze	Exploring the Usefulness of Adding Auxiliary Preprocessed Image Layers with Convolutional Neural Networks

Science 1128**Theme: SW Engineering****Session Chair: Mark Hall**

12:45 PM	Jens Carter, Eric Mcdaniel, Mason Countney, Saleh Alnaeli and Warren Vaz	Quality of Engineering Computing Software Systems from Software Engineering Perspective: an Empirical Case-Study of OpenFOAM
1:15 PM	Andrew Erickson, Dennis Guster, Leena Radeke and Erich Rice	Quantum Information Systems: The State Of Post-Quantum Cryptography As A Means To Combat Shor's Algorithm
1:45 PM	Cole Nelson and Joshua Yue	SPOT: a domain-specific language for code modification

Science 1104**Theme: 3D Modeling****Session Chair: Dan Neebel**

2:30 PM	Tyler Welander, Ronald Marsh and Md Nurul Amin	G-Code Modeling for 3D Printer Quality Assessment
3:00 PM	Andrew Jones and Jeremy Straub	Student Benefits from Participation in a NASA-mentored 3D Printing Research Project
3:30 PM	Robert Prescott and Chris Johnson	Lofting Three-Dimensional Shapes

Science 1109**Theme: Curriculum****Session Chair: Saleh Alnaeli**

2:30 PM	Jeremy Straub and Kendall E. Nygard	Creation of a Cyber Security Institute to 'Lead the Pack' in North Dakota
3:00 PM	Kendall Nygard, Vikas Kulkarni, Jagjot Bhardwaj, Minhaz Chowdhury and Krishna Kambhampaty	Interactive Educational Games for Cybersecurity Education
3:30 PM	Brady Cooper and Erich Rice	Development and Delivery of Enterprise Architecture Related In-Class Labs: Current and Future States

Science 1127**Theme: Machine Learning****Session Chair: Marty Allen**

2:30 PM	Yuxin Liu, Song Chen and Mao Zheng	Using Machine Learning in Sales Predication
2:30 PM	Corbin Faidley, Robert Robinson and Stephen Hughes	Technology Assisted Review with Iterative Classification
3:00 PM	Tom Richmond and Imad Rahal	Algorithmic Composition of Classical Music through Data Mining

Science 1128**Theme: Software****Session Chair: Elena Machkasova**

2:30 PM	Joseph Stewart	Quality of Service Implementation within IEEE 802.11 DCF Interframe Space
3:00 PM	Alexander Stewart	Authentication Strategies for the Maritime Automated Identification System (AIS)
3:30 PM	Charlot Shaw	To Err Like Human: Improving Beginner Interactions in Clojure

Parallel Sessions III**Saturday, April 07****8:45 am – 10:15 am****Science 1106****Theme: UX****Session Chair: J. Philip East**

8:45 AM	J. Philip East and Andrew Berns	Creating an SOA for Introductory Programming Courses
9:15 AM	Ananda Poudel and Omar Al-Azzam	Interior Design with Augmented Reality
9:45 AM	Curt Hill	Visualizing Live Data Structures

Science 1109**Theme: Curriculum****Session Chair: Kristopher Glesener**

8:45 AM	Donald Heier	Re-designing a computer science program for tomorrow's leaders
9:15 AM	Peter Peterson, Jon Beaulieu, Mazin Jindeel, Aleksandar Straumann and Brandon Paulsen	Do This and Nothing More: Teaching Adversarial Thinking Without Security
9:45 AM	Shaun Lynch	Streamlining Workstation Deployment and Configuration in an Academic Computing Environment

Science 1111**Theme: Machine Learning & Time Series****Session Chair: Andrew A. Anda**

8:45 AM	Devin Timaul, Aleksandr Lukanen and Brandon Ly	Applying Deep Learning to Better Predict Cryptocurrency Trends
9:15 AM	Israt Jahan and Sayeed Sajal	Stock Price Prediction Using Supervised Machine Learning Algorithm
9:45 AM	Mostofa Ahsan, Rahul Gomes and Anne Denton	Fusion of SMOTE and outlier detection techniques for land-cover classification using Support Vector Machines

Science 1128**Theme: Applications****Session Chair: Dan Neebel**

8:45 AM	Leonid Scott	The Application of Evolutionary Computation in the Design of Wing Shapes
9:15 AM	Zachery Crandall and Paul Hinker	Open-source, Extensible Software for Advanced Spectroscopic Analysis
9:45 AM	Andrew Erickson, Dennis Guster, Leena Radeke and Erich Rice	Understanding Quantum Information Systems: Take Your Cue from the Qubit

10:15 am – 10:30 am**Refreshments****Science 3116 Commons**

Science 1106		
Theme: Renewable Resources		Session Chair: Curt Hill
10:30	Jay Chaudhari, Sujan Shrestha, Igor Ceridorio and John Hastings	Water Conservation through Educational Application
11:00	Ryan Policheri and Aaron Smith	Mechanical Mass-Energy Storage Systems: Making Green, Renewable Energy Work
11:30	Abenezer Monjor, Yujing Song and Khondoker Prio	Power Monitoring and Prediction Software

Science 1109		
Theme: Educational Games		Session Chair: Karen Arlien
10:30	Mark Meysenburg	Charles Babbage, Ada Lovelace, and the Dawn of Computing
11:00	Mark Brodie	Play SQL - Learning Database Querying using a Game
11:30	Adrian Abundez-Arce and Chris Johnson	Sensorflow: Learning Language Through Motion

Science 1111		
Theme: Web		Session Chair: Jennifer Rosato
10:30	Randy Campbell, Alex Boettger and Jared Martin	Universal AJAX Interface Generation
11:00	Mitchell Petit and Yi Liu	A Comparison of Technologies for Developing Web-Based Online Multiplayer Games
11:30	Shin-Ping Tucker	A Success Model of E-commerce Systems

Science 1128		
Theme: Curriculum		Session Chair: Scott Kerlin
10:30	Jeremy Straub	Curriculum Development for a World Class Cybersecurity Program
11:00	Scott Kerlin	Scaling Up to Scale Down
11:30	Malvern Madondo, Daniela Moreno Gomez and Nicole Ciernia	Hitchhiker's Guide to Computer Science for Social Good

Science 3106		
Theme: Faculty Birds-of-a-Feather		
10:30 – 12:00	Mark Fienup	Faculty Birds-of-a-Feather: Pedagogy, CS Department Issues, Future of MICS

Poster Sessions

Friday, April 06

4:00 pm – 5:00 pm

Science Benedictine Commons Poster Session		
Poster 1	Jennifer Vang	WIMP vs. post-WIMP GUIs in Virtual Reality
Poster 2	Sergei Bezroukov and Tanner Paulson	Automatic Cats Feeder
Poster 3	Patrick Balfanz and Chris Johnson	Mannequino
Poster 4	Abby Panfil	How Stressors Affect Hard Drive Performance
Poster 5	Nicholas Joslyn, Kelby Kies, Manoj Rai and Derek Lyons	Advancing Medication Development by Combining Collaborative Crowdsourcing and Bioinformatics
Poster 6	Luciano Ricotta, Logan Kubovec, Emily Prince and Danial Neebel	The Black Hole Project
Poster 7	Derek Lyons, Heidi Berger, Mark Brodie and Clint Meyer	Bridge to STEM Success Program
Poster 8	Malvern Madondo	Learning and Modeling Chaos Using LSTM Recurrent Neural Networks.
Poster 9	Gord Boyer and John Bate	Crowdmark collaborative exam marking
Poster 10	Greta Jenkins	Effects of Prompt Explicitness in a Voice Interface

Sequential List of all Submissions

#	Authors	Title	Participation
2	Andrew Erickson, Dennis Guster, Leena Radeke and Erich Rice	Understanding Quantum Information Systems: Take Your Cue From The Qubit	Paper
3	Andrew Erickson, Dennis Guster, Leena Radeke and Erich Rice	Quantum Information Systems: The State Of Post-Quantum Cryptography As A Means To Combat Shor's Algorithm Run On A Scalable Quantum Computer	Paper
4	Scott Kerlin	Scaling Up to Scale Down	Paper
5	Mark Meysenburg	Charles Babbage, Ada Lovelace, and the Dawn of Computing	Paper
6	Donald Heier	Re-designing a computer science program for tomorrow's leaders.	Paper
7	Ahmed El-Saied, Wen-Chen Hu, Naima Kaabouch and Fatima El Jamiy	A Location-Based Service Using a Server-Side Geographical Database	Paper
8	Tom Richmond and Imad Rahal	Algorithmic Composition of Classical Music through Data Mining	Paper
9	Mark Fienup	Faculty Birds-of-a-Feather	Panel Discussion
10	Ananda Poudel and Omar Al-Azzam	Interior Design with Augmented Reality	Paper
11	Brady Cooper and Erich Rice	Development and Delivery of Enterprise Architecture Related In-Class Labs: Current and Future States	Paper
12	Tyler Welander, Ronald Marsh and Md Nurul Amin	G-Code Modeling for 3D Printer Quality Assessment	Paper
13	Alexander Stewart	Authentication Strategies For The Maritime Automated Identification System (AIS)	Paper
14	Drew Klein	The Application of Concepts from Multiple Courses in Creating a Useful App for the University	Paper

15	Jennifer Vang and Thomas Gibbons	WIMP vs. post-WIMP GUIs in Virtual Reality	Poster/ Software
16	Sergei Bezroukov and Tanner Paulson	Automatic Cats Feeder	Poster/ Software
17	Ashby Mullin	Using Deep Learning to Examine the Classification of Historical Data Through Neural Networks: The Sudoku Puzzle	Paper
18	Curt Hill	Visualizing Live Data Structures	Paper
20	J. Philip East and Andrew Berns	The Benchmarking Programming Exam and SOA in Introductory Programming Courses	Paper
21	Randy Campbell, Alex Boettger and Jared Martin	Universal AJAX Interface Generation	Paper
22	Greta Jenkins and Thomas Gibbons	Effects of Prompt Explicitness in a Voice Interface	Paper
23	Mitchell Petit and Yi Liu	A Comparison of Technologies for Developing Web-Based Online Multiplayer Games	Paper
24	Mark Brodie	Play SQL - Learning Database Querying using a Game	Paper
25	Ryan Policheri and Aaron Smith	Mechanical Mass-Energy Storage Systems: Making Clean, Renewable Energy Work	Paper
26	Malvern Madondo and Tom Gibbons	Learning and Modeling Chaos Using LSTM Recurrent Neural Networks.	Poster/ Software
27	Alexander Pauls and Josiah Yoder	Exploring Optimum Drop-out Rate for Classic Neural Networks	Paper
28	Patrick Balfanz and Chris Johnson	Mannequino	Poster/ Software
29	Jennifer Rosato, Chery Lucarelli and Jill Long	Computational Thinking for All Pre-Service Teachers	Paper
30	Benjamin Zwiener	Mobile SuDoKu Harvesting App	Paper
31	Abby Panfil	How Stressors Affect Hard Drive Performance	Poster/ Software
32	Nicholas Joslyn, Kelby Kies, Manoj Rai and Derek Lyons	Advancing Medication Development by Combining Collaborative Crowdsourcing and Bioinformatics	Poster/ Software
33	Shaun Lynch	Streamlining Workstation Deployment and Configuration in an Academic Computing Environment	Paper
34	Luciano Ricotta, Logan Kubovec, Emily Prince and Danial Neebel	The Black Hole Project	Poster/ Software
35	Derek Lyons, Heidi Berger, Mark Brodie and Clint Meyer	Bridge to STEM Success Program	Poster/ Software
36	Leonid Scott	The Application of Evolutionary Computation in the Design of Wing Shapes	Paper
37	Robert Prescott and Chris Johnson	Lofting Three-Dimensional Shapes	Paper
38	Jay Chaudhari, Sujan Shrestha, Igor Ceridorio and John Hastings	Water Conservation through Educational Application	Paper
39	Charlot Shaw	To Err Like Human: Improving Beginner Interactions in Clojure	Poster/ Software
40	Corbin Faidley, Robert Robinson and Stephen Hughes	Technology Assisted Review with Iterative Classification	Paper
41	Malvern Madondo, Daniela Moreno Gomez and Nicole Ciernia	Hitchhiker's Guide to Computer Science for Social Good	Paper
42	Rahul Gomes, Mostofa Ahsan and Anne Denton	Fusion of SMOTE and outlier detection techniques for land-cover classification using Support Vector Machines	Paper
43	Gord Boyer and John Bate	Crowdmark collaborative exam marking	Poster/ Software

44	Shin-Ping Tucker	A Success Model of E-commerce Systems	Paper
45	Peter Peterson, Jon Beaulieu, Mazin Jindeel, Aleksandar Straumann and Brandon Paulsen	UMDCYL and Little Python: Teaching Coding by Playing Games	Nifty Assignments
46	Peter Peterson, Jon Beaulieu, Mazin Jindeel, Aleksandar Straumann and Brandon Paulsen	Do This and Nothing More: Teaching Adversarial Thinking Without Security	Nifty Assignments
47	Zachery Crandall and Paul Hinker	Open-source, Extensible Software for Advanced Spectroscopic Analysis	Paper
48	Jordan Goetze	Exploring the Usefulness of Adding Auxiliary Preprocessed Image Layers With Convolutional Neural Networks	Paper
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50	Joseph Stewart, David Ehley, Miguel Estrada, Zaid Altahat and Kamil Samara	Quality of Service Implementation within IEEE 802.11 DCF Interframe Space	Paper
52	Khondoker Prio, Vipul Sharma, Yujing Song and Abenezzer Monjor	Power Monitoring and Predictions Software	Paper
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54	Jeremy Straub	Curriculum Development for a World Class Cybersecurity Program	Paper
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60	Andrew Jones and Jeremy Straub	Student Benefits from Participation in a NASA-mentored 3D Printing Research Project	Paper
61	Jens Carter, Eric McDaniel, Saleh Alnaeli and Warren Vaz	Quality Of Engineering Computing Software Systems: An Empirical Case-Study Of Openfoam (2011-2018)	Paper
62	Alex Boettger, Jared Martin and Randy Campbell	Universal AJAX Interface Generation	Paper
63	Mark Brodie	Play SQL: Learning Database Querying using a Game	Paper
64	Alexander Stewart, Erich Rice and Paul Safonov	Digital Authentication Strategies for the Automated Identification System	Paper
65	Robert Prescott and Chris Johnson	Lofting 3D Shapes	Paper

Acknowledgments

The Organizing Committee for MICS 2018 thanks our keynote speaker, Dr. Maria Gini, and our faculty and student presenters and other attendees. We also thank our student volunteers, and the staff of The College of St. Scholastica which supported us in so many ways. We would also like to thank our Career Fair participant, Digi-Key Corporation for their generous sponsorship of the robotics and programming contests.