34th International Conference on
Computers and Their Applications
(CATA 2019)

PROGRAM

March 18–20, 2019

Waikiki Beach Marriott Resort
Honolulu, Hawaii, USA

Sponsored by

International Society for
Computers and Their Applications

PO Box 1124
Winona, MN 55987
Phone: (507) 458-4517; e-mail: isca@isca-hq.org; website: www.isca-hq.org
International Society for Computers and Their Applications (ISCA)

General Chair: Les Miller, Iowa State University, USA
Program Co-Chairs: Gordon Lee, San Diego State University, USA
Ying Jin, California State University, Sacramento, USA

International Program Committee

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Behnam Arad  California State University at Sacramento
Antoine Bossard  Kanagawa University, Japan
Sergiu Dascalu  University of Nevada, Reno
Biduyt Gupta  Southern Illinois University
Ahmed Kamel  Concordia College
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Hidetsugu Kohzaki  Kyoto University, Japan
Chung-Hong Lee  National Kaohsiung University of Applied Sciences, Taiwan
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Kiyoshi Nagata  Daito Bunka University, Japan
Hiroki Nomiya  Kyoto Institute of Technology, Japan
Kendall Nygard  North Dakota State University
Mehdi Owrang  American University
Sharad Sharma  Bowie State University
Yong Shi  Kennesaw State University
Atsushi Shibata  Advanced Institute of Industrial Technology, Japan
Koushik Sinha  Southern Illinois University
Kiyofumi Tanaka  Japan Advanced Institute of Science and Technology, Japan
Hsine-Jen Tsai  Fu Jen University, Taiwan
# Schedule at a Glance

## Monday 3/18

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:45am - 9:00am</td>
<td>Welcoming Remarks: Milo 4-5</td>
</tr>
<tr>
<td>9:00am - 10:00am</td>
<td>Keynote I: Milo 4-5</td>
</tr>
<tr>
<td>10:30am - 12:00pm</td>
<td>Session M-A2: Milo 3</td>
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12:00pm – 1:30pm **Lunch break (on your own)**

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>1:30pm - 3:00pm</td>
<td>Session M-P1: Milo 3</td>
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<tr>
<td>3:30pm - 5:30pm</td>
<td>Session M-P3: Milo 3</td>
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## Tuesday 3/19

<table>
<thead>
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<tbody>
<tr>
<td>9:00am - 10:00am</td>
<td>Keynote 2: Milo 4-5</td>
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<tr>
<td>10:30am - 12:00pm</td>
<td>Session T-A2: Milo 3</td>
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</tbody>
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12:00pm – 2:00pm **Conference Luncheon: Waikiki Ballroom**

<table>
<thead>
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<tbody>
<tr>
<td>2:00pm - 3:30pm</td>
<td>Session T-P1: Milo 3</td>
</tr>
<tr>
<td>4:00pm - 5:30pm</td>
<td>Session T-P3: Milo 3</td>
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## Wednesday 3/20

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<tr>
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<tr>
<td>10:30am - 12:00pm</td>
<td>Session W-A2: Milo 3</td>
</tr>
</tbody>
</table>

12:00pm: **Conference Ends**
Monday, March 18, 2019

8:00 a.m. – 3:30 p.m.  REGISTRATION – Coffee, tea, pastries – Milo 4-5 Lanai

8:45 a.m. – 9:00 a.m.  WELCOME – Milo 4-5  
Gordon Lee, San Diego State University 
Ying Jin, California State University, Sacramento 
Les Miller, Iowa State University

9:00 a.m. – 10:00 a.m. KEYNOTE SPEAKER

Dr. Tamer Kahveci  
Director, Bioinformatics Lab  
University of Florida

Computational Analysis of Interactomes: Challenges, Solutions, and Opportunities 
Location: Milo 4-5 
Session Chair: Oliver Eulenstein (Iowa State University, USA)

10:00 a.m. – 10:30 a.m. COFFEE BREAK: Milo 4-5 Lanai

SESSION M-A2  
COMPUTERS IN EDUCATION  
Monday March 18, 10:30 a.m. – 12:00 p.m.  
Session Chair: Tamer Aldwairi  
(Mississippi State University and Ursinus College)  
Location: Milo 3

1. Planning Computational Biology Projects Using Agile Approach  
   Tamer Aldwairi (Mississippi State University and Ursinus College)

2. RealPi - A Real Time Operating System on the Raspberry Pi  
   Samuel Delaney, Dwight Egbert, and Frederick C. Harris, Jr.  
   (University of Nevada, Reno)

3. Virtual Reality Physics Lab  
   Andrew E. Munoz, Christopher J. Lewis, Nicholas Bolling, William Zandbergen,  
   Connor Scully-Allison, Vinh Le, Sergiu Dascalu, and Benjamin Brown  
   (University of Nevada, Reno)

4. A Study of Computer Information Systems Discipline with Layout and Analysis  
   Mohamed Shenify (Albaha University, Saudi Arabia), Hisham Al-Mubaid (University of Houston-Clear Lake), Sultan Aljahdali (Taif University, Saudi Arabia), and Abdulaziz Alangari (Taif University, Saudi Arabia)
12:00 p.m. – 1:30 p.m.  LUNCH BREAK ON OWN

**COMPUTATIONAL ISSUES**
Monday March 18, 1:30 p.m. – 3:00 p.m.
Session Chair: Ying Jin (California State University, Sacramento)
Location: Milo 3

   Luka Daoud, Fady Hussein, and Nader Rafla (Boise State University)

2. A New Method of Calculating Square Euclidean Distance (SED) Using pTree Technology and Its Performance Analysis
   Mohammad K. Hossain and Sameer Abufardeh (University of Minnesota, Crookston)

   Thitivatr PatanasakPinyo (Mahidol University, Thailand)

4. XACML Implementation Based on Graph Databases
   Ying Jin and Krishna Chaitanya Kaja (California State University, Sacramento)

**ALGORITHMS I**
Monday March 18, 1:30 p.m. – 3:00 p.m.
Session Chair: Sergiu Dascalu (University of Nevada at Reno)
Location: Milo 2

1. New Classes of Monohedral Spherical Tilings by Non-Convex Spherical Hexagons and Non-Convex Spherical Pentagons with GeoGebra
   Ana Maria D’Azevedo Breda (Universidade de Aveiro, Portugal) and José Manuel Dos Santos Dos Santos (Universidade Aberta, Portugal)

2. A Novel Multi-Radio Rendezvous Algorithm for Cognitive Radio Networks
   Michael Fischer and Jonathan Backens (Christopher Newport University)

3. An NC Algorithm for Sorting Real Numbers in $O\left(\frac{n \log n}{\log \log n}\right)$ Operations
   Yijie Han, Sneha Mishra, and Md Usman Gani Syed (University of Missouri at Kansas City)

4. Weighted Record Sample for Underwater Seismic Monitoring Application
   Hussain Albarakati (University of Connecticut), Reda Ammar (University of Connecticut), and Raafat Elfouly (Rhode Island College)
3:00 p.m. – 3:30 p.m.  COFFEE BREAK: Milo 4-5 Lanai

SESSION M-P3

COMPUTER SECURITY
Monday March 18, 3:30 p.m. – 5:30 p.m.
Session Chair: Behnam Arad (California State University, Sacramento)
Location: Milo 3

1. Choosing the Best-fit Lifecycle Framework while Addressing Functionality and Security Issues
   Salman M. Faizi (Capella University) and Shawon S. M. Rahman (University of Hawaii-Hilo and Capella University)

2. Customized Intrusion Detection Based on a Database Audit Log
   Thomas Le (California Department of Internal Relations), William Mitchell (California State University, Sacramento), and Behnam Arad (California State University, Sacramento)

3. Behaviour Based Ransomware Detection
   Christopher J. W. Chew and Vimal Kumar (University of Waikato, New Zealand)

4. A Multi-Stage Detection Technique for DNS-Tunneled Botnets
   Tirthankar Ghosh (University of West Florida), Eman El-Sheikh (University of West Florida), and Wasseem Jammal (Cloud State University)

5. Evaluation of Secrecy Rate in the Cooperative Communication System
   Cheng-Ying Yang (University of Taipei, Taiwan), Hsin-Ying Liang (Chaoyang University of Technology, Taiwan), and Pin-Yen Huang (National Chengchi University, Taiwan)

SESSION M-P4

Programming and Software Engineering
Monday March 18, 3:30 p.m. – 5:30 p.m.
Session Chair: Kendall E. Nygard (North Dakota State University)
Location: Milo 2

1. Analyzing JavaScript Programs Using Octagon Domain
   Nabil Almashfi and Lunjin Lu (Oakland University)

2. A Compiler-Assisted Locality Aware CTA Mapping Scheme
   Lifeng Liu (Wright State University), Meilin Liu (Wright State University), and Chongjun Wang (Nanjing University, China)

3. Software Engineering Principles and Security Vulnerabilities
   Aakanksha Rastogi and Kendall E. Nygard (North Dakota State University)

4. Vetting Anti-patterns in Java to Kotlin Translation
   Chaney Courtney and Mitchell Neilsen (Kanas State University)

5. Web Request Predictions
   Randy Appleton, Ben Slater, Connor Laitinen, Luke Ammel, and Cody Malnor (Northern Michigan University)
8:00 a.m. – 3:30 p.m.  REGISTRATION – Coffee, tea, pastries – Milo 4-5 Lanai

9:00 a.m. – 10:00 a.m.  KEYNOTE SPEAKER

Dr. Kelvin Richards
Director, International Pacific Research Center
University of Hawaii

MODELING EARTH’S OCEAN AND ATMOSPHERE:
THE CHALLENGE OF CAPTURING RELEVANT SCALES

Location: Milo 4-5
Session Chair: Gordon Lee (San Diego State University, USA)

10:00 a.m. – 10:30 a.m.  COFFEE BREAK: Milo 4-5 Lanai

SESSION T-A2

COMPUTERS IN HEALTHCARE
Tuesday March 19, 10:30 a.m. – 12:00 p.m.
Session Chair: M. Mehdi Owrang Ojaboni (American University)
Location: Milo 3

1. Implementation of Security and Privacy Aspects in a Healthcare Social Network
   Kasi Periyasamy and Saleh Alsyefi (University of Wisconsin-La Crosse)

2. Smart Mobile Computing in Pregnancy Care
   Francisca Fonseca (University of Minho, Portugal), Hugo Peixoto (University of Minho, Portugal), Jorge Braga (Centro Hospitalar do Porto, Portugal), José Machado (University of Minho, Portugal), and António Abelha (University of Minho, Portugal)

3. Prediction of Drowsy Driving Using EEG and Facial Expression by Machine Learning
   Daichi Naito, Ryo Hatano and Hiroyuki Nishiyama (Tokyo University of Science, Japan)

4. Ethnicity-Related Survival Analysis of Patients with Triple-Negative Breast Cancer
   M. Mehdi Owrang Ojaboni (American University), Yasmine M. Kanaan (Howard University), and Robert L. Dewitty, Jr. (Providence Hospital)

12:00 p.m. – 2:00 p.m.  CONFERENCE LUNCHEON
AND BEST PAPER AWARD

Location: Waikiki Ballroom
SESSION T-P1

VISUALIZATION
Tuesday March 19, 2:00 p.m. – 3:30 p.m
Session Chair: Tina V. Johnson (Midwestern State University)
Location: Milo 3

1. Enhanced Prediction Models for Predicting Spatial Visualization (VZ) in Address Verification Task
   Thitivatr PatanasakPinyo (Mahidol University, Thailand), Georgi Batinov (Iowa State University), Kofi Whitney (Iowa State University), Adel Sulaiman (Iowa State University), and Les Miller (Iowa State University)

2. NetLogo and GIS: A Powerful Combination
   Broday Walker and Tina V. Johnson (Midwestern State University)

3. Parking Lot Occupancy Tracking Through Image Processing
   Marcos Lopez, Terry Griffin, Kevin Ellis, Anthony Enem, and Christopher Duhan (Midwestern State University)

4. An Alternative Natural Action Interface for Virtual Reality
   Jay Woo, Andrew Frost, Tyler Goffinet, Vinh Le, Connor Scully-Allison, Chase Carthen, and Sergiu Dascalu (University of Nevada, Reno)

SESSION T-P2

ALGORITHMS II
Tuesday March 19, 2:00 p.m. – 3:30 p.m.
Session Chair: Antoine Bossard (Kanagawa University, Japan)
Location: Milo 2

1. TDARMA Model Estimation Using the MLS and the TF Distribution
   Abdullah I. Al-Shoshan (Qassim University, Saudi Arabia)

2. Refining the Unrestricted Character Encoding for Japanese
   Antoine Bossard (Kanagawa University, Japan) and Keiichi Kaneko (Tokyo University of Agriculture and Technology, Japan)

3. Smooth Trajectory Planning for Autonomous Leader-Follower Robots
   KaC Cheok, Kiran Iyengar, and Sami Oweis (Oakland University)

4. Predicting Cow's Delivery Using Movement and Position Data Based on Machine Learning
   Yusuke Ono, Ryo Hatano, Hayato Ohwada, and Hiroyuki Nishiyama (Tokyo University of Science, Japan)

3:30 p.m. – 4:00 p.m.  COFFEE BREAK:  Milo 4-5 Lanai
SPECIAL SESSION: SOFTWARE ENGINEERING APPLICATIONS

Tuesday March 19, 4:00 p.m. – 5:30 p.m.
Session Chair: Gongzhu Hu (Central Michigan University)
Location: Milo 3

1. Study of Secured Full-Stack Web Development
   Ziping Liu (Southeast Missouri State University) and Bidyut Gupta (Southern Illinois University at Carbondale)

2. Emergency Communications Database with Ticketing Archive for Training New Employees
   Dustin T. Ginn, Ilhyun Lee, and Haesun Lee
   (The University of Texas of the Permian Basin)

3. A Novel Delivery Model to Expand E-commerce Customers Based on Telecom Data Mining
   Giridhar Maji (Asansol Polytechnic, India), Sharmistha Mandal (University of Calcutta, India), Narayan C Debnath (Eastern International University, Vietnam), and Soumya Sen (University of Calcutta, India)

4. A Novel Neighborhood Calculation Method by Assessing Users’ Varying Preferences in Collaborative Filtering
   Pradeep Kumar Singh (National Institute of Technology Durgapur, India), Pijush Kanti Dutta Pramanik (National Institute of Technology Durgapur, India), Narayan C. Debnath (Eastern International University, Vietnam), and Prasenjit Choudhury (National Institute of Technology Durgapur, India)

CLOUD COMPUTING

Tuesday March 19, 4:00 p.m. – 5:30 p.m.
Session Chair: Gordon Lee (San Diego State University)
Location: Milo 2

1. Secured Cloud for Enterprise Computing
   Salman M. Faizi (Capella University) and Shawon S. M. Rahman (University of Hawaii-Hilo and Capella University)

2. Construction Scheme of a Scalable Distributed Stream Processing Infrastructure Using Ray and Apache Kafka
   Kasumi Kato (Ochanomizu University, Japan), Atsuko Takefusa (National Institute of Informatics, Japan), Hidemoto Nakada (National Institute of Advanced Industrial Science and Technology, Japan), and Masato Oguchi (Ochanomizu University, Japan)

   Maryam Alruwaythi, Krishna Kambampaty, and Kendall E. Nygard
   (North Dakota State University)

4. Adopting and Implementing a Government Cloud in Saudi Arabia, an Integral Part of Vision 2030
   Mohammed O. Alanssary and Yasser M. Hausawi
   (The Institute of Public Administration, Jeddah, Saudi Arabia)

5. TrustedDW: A new Framework to Securely Hosting Data Warehouse in The Cloud
   Karkouda Kawthar, Nabli Ahlem and Gargouri Faiez (Laboratoire Miracl, Tunisia)
8:00 a.m. – 11:00 a.m. REGISTRATION – Coffee, tea, pastries – Milo 4-5 Lanai

SESSION W-A1

COMPUTERS IN MANUFACTURING AND BUSINESS
Wednesday March 20, 8:30 a.m. – 10:00 a.m.
Session Chair: Frederick C. Harris, Jr. (University of Nevada at Reno)
Location: Milo 3

1. Finite Element Analysis of 3D Printed Aircraft Wing
   Julian Rogers and Hormoz Zareh (Portland State University)

2. Learning Financial Time Series for Prediction of the Stock Exchange Market
   Roberto Rosas-Romero and Juan Pablo Medina-Ochoa
   (Universidad de las Americas-Puebla, Mexico)

3. Effect of Magnet Shapes on Metal Contamination Removal
   Takashi Ohnishi (Saitama University and Magnetic Japan Ltd., Japan), Takashi Okamoto
   (Saitama University and Magnetic Japan Ltd., Japan), and Keichi Watanuki (Saitama
   University, Japan)

4. Improving the Performance of 3D Printed Molds for Plastic Injection Molding
   Faryar Etesami, Christopher D. Mullens, Ramsey G. Sahli, and Trey J. Webb
   (Portland State University)

10:00 a.m. – 10:30 a.m. COFFEE BREAK: Milo 4-5 Lanai

APPLICATIONS

SESSION W-A2

Wednesday March 20, 10:30 a.m. – 12:00 p.m.
Session Chair: Ka C. Cheok (Oakland University)
Location: Milo 3

1. Neuro-fuzzy-based Electronic Brake System Modeling using Real Time Vehicle Data
   Ana Farhat (Oakland University), Kyle Hagen (Continental Automotive Systems, Inc.),
   Ka C. Cheok (Oakland University), and Balaji Boominathan (Continental Automotive
   Systems, Inc.)

2. Data Driven Analytics of Road Quality
   Ali Rahim Taleqani, Raj Bridgelall, Jill Hough, and Kendall E. Nygard
   (North Dakota State University)

3. An Empirical Examination of the Effects of IT Leadership on Information Security
   Risk Management in USA Organizations
   Henry Okonofua (Capella University), Shawon S. M. Rahman (University of Hawaii-Hilo
   and Capella University), and Reni Ivanova (University of Hawaii-Hilo)

4. L, M & A: An Algorithm for Music Lyrics Mining and Sentiment Analysis
   Vasu Saluja, Minni Jain, and Prakarsh Yadav (Delhi Technological University, India)