

**The Thirty-First International Florida  
Artificial Intelligence Research Society Conference**  
**FLAIRS-31**  
*Program of Events*



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**May 21-23, 2018**  
**Crowne Plaza Melbourne Oceanfront**  
**Melbourne, Florida, USA**

# The 31st International Florida Artificial Intelligence Research Society Conference



## Welcome from the Conference Chairs

Welcome to the 31st International FLAIRS conference and to wonderful Melbourne, Florida!

FLAIRS-31 continues the tradition of previous FLAIRS conferences with a high quality program.

The call for papers attracted 150 paper submissions (61 to the general conference and 89 to the special tracks), and 27 poster abstracts. Special tracks are a vital part of the FLAIRS conferences, with 12 being held at FLAIRS-31. All papers were reviewed by at least three reviewers, and were coordinated by the program committees of the general conference and the special tracks. The accepted submissions include 70 full papers (24 from the general conference and 46 from the special tracks), 34 short papers presented as posters (16 from the general conference and 18 from the special tracks), and 25 accepted poster abstracts that appear in the proceedings.

In addition to the diverse assortment of papers, one of the highlights of the program are the invited speakers. Our General Conference Invited Keynote Speakers are Rina Dechter (University of California at Irvine, USA), Raymond Mooney (University of Texas at Austin, USA), and Peter Wurman (VP of Engineering at Cogitai). In addition, our Special Track Invited Speakers are Santiago Ontañón (Drexel University), Lewis Frey (Hollings Cancer Center), and Kallirroi Georgila (USC/ICT).

This program is the product of the collaboration and hard work of several people, whom we consider ourselves fortunate to have worked with. We are grateful to all special track organizers and their committees, whose work resulted in an outstanding and diverse set of talks that span numerous areas within AI.

We have been looking forward to the conference and also to be meeting in Melbourne. The Crowne Plaza Melbourne- Oceanfront is a full-service destination resort, with 10000 square feet of conference facilities and 6000 square feet of outdoor beachside deck on world-class, white sandy beaches of Melbourne overlooking the Space Coast and the Atlantic. We hope you find the conference enriching and that you find time to explore what Melbourne has to offer.

Again, welcome to FLAIRS-31. We are glad you are able to join us this year!

*Zdravko Markov, Vasile Rus, Keith Brawner, and Roman Barták*  
*FLAIRS-31 Organizing Team*

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## Conference Invited Speakers

**Monday, May 21, 9:00am – 10:00 am**

### **Raymond Mooney**

Professor in the Department of Computer Science at the University of Texas at Austin

#### **Robots that Learn Grounded Language through Interactive Dialog**

**Abstract:** In order to develop an office robot that learns to accept natural language commands, we have developed methods that learn from natural dialog with ordinary users rather than from manually labeled data. By engaging users in dialog, the system learns a semantic parser, an effective dialog management policy, and a grounded semantic lexicon that connects words to multi-modal (visual, auditory and haptic) perception. In addition to learning from clarification dialogs when understanding user commands, it also engages people in interactive games such as "I Spy." We have tested our approach on both simulated robots using on-line crowdsourced users on the web as well as with people interacting with real robots in our lab. Experimental results demonstrate our methods produce more successful, shorter dialogs over time and learn to accurately identify objects from natural language descriptions using multi-modal perception.

**Biographical Sketch:** Raymond J. Mooney is a Professor in the Department of Computer Science at the University of Texas at Austin. He received his Ph.D. in 1988 from the University of Illinois at Urbana/Champaign. He is an author of over 160 published research papers, primarily in the areas of machine learning and natural language processing. He was the President of the International Machine Learning Society from 2008-2011, program co-chair for AAAI 2006, general chair for HLT-EMNLP 2005, and co-chair for ICML 1990. He is a Fellow of the American Association for Artificial Intelligence, the Association for Computing Machinery, and the Association for Computational Linguistics and the recipient of best paper awards from AAAI-96, KDD-04, ICML-05 and ACL-07.

**Tuesday, May 22, 9:00am – 10:00 am**

**Peter Wurman**

Vice President of Engineering at Cogitai

**How Kiva Robots Disrupted Warehousing**

**Abstract:** Kiva Systems introduced swarms of agile robots into an industry dominated by stationary conveyor systems. The path from concept through successful startup and eventual acquisition involved challenges on all fronts. In this talk I'll explain the business problem that motivated the innovation, Kiva technology and the benefits it brought to customers, and the future of applications of robotics in warehouses.

**Biographical Sketch:** Pete Wurman is currently VP of Engineering at Cogitai, a startup in the space of machine learning. Prior to Cogitai, Pete was a Co-founder and CTO of Kiva Systems, the Boston-based company that pioneered the use of mobile robotics in warehouses and distribution facilities. In May of 2012, Kiva was acquired by Amazon.com, which has now deployed tens of thousands of Kiva robots into its warehouses. Prior to joining Kiva, Pete was an Associate Professor of Computer Science at North Carolina State University in Raleigh, NC. Pete's teaching focus was e-commerce systems, and his research focused on electronic auctions (especially combinatorial auctions), multi-agent systems, and resource allocation.

**Wednesday, May 23, 9:00am – 10:00 am**

**Dr. Rina Dechter**

Donald Bren School of Information and Computer Sciences, UC Irvine

**Probabilistic Reasoning Meets Heuristic Search**

**Abstract:** Graphical models, including constraint networks, Bayesian networks, Markov random fields and influence diagrams, have become a central paradigm for knowledge representation and reasoning in Artificial Intelligence, and provide powerful tools for solving problems in a variety of application domains, including coding and information theory, signal and image processing, data mining, learning, computational biology, and computer vision. Although past decades have seen considerable progress in algorithms in graphical models, many real-world problems are of such size and complexity that they remain out of reach. Advances in exact and approximate inference methods are thus crucial to address these important problems with potential impact across many computational disciplines. Exact inference is typically NP-hard, motivating the development of approximate and anytime techniques.

Existing algorithms typically take one of two approaches: Inference, expressed as message-passing schemes, or search and conditioning methods. In the past decade, my research group at UCI has developed state-of-the art algorithms based on combining heuristic search with variational-based message passing approximations, winning a few solver competitions.

In this talk she reviews the main principles behind the AND/OR search and show how it can be guided by heuristics based on variational inference (e.g., decomposition bounds such as weighted mini-bucket and cost-shifting schemes) for solving probabilistic and deterministic graphical models queries such as satisfiability, optimization (e.g., MAP), weighted counting (e.g., probability of evidence) and their combinations (e.g., maximizing expected utility) that allow flexible trading of memory for time and time for accuracy. Emerging solvers aim for anytime behavior that generates not only an approximation that improves with time, but also upper and lower bounds which become tighter with more time.

**Biographical Sketch:** Rina Dechter's research centers on computational aspects of automated reasoning and knowledge representation including search, constraint processing, and probabilistic reasoning. She is a Chancellor's Professor of Computer Science at the University of California, Irvine. She holds a Ph.D. from UCLA, an M.S. degree in applied mathematics from the Weizmann Institute, and a B.S. in mathematics and statistics from the Hebrew University in Jerusalem. She is an author of Constraint Processing published by Morgan Kaufmann (2003), and Reasoning with Probabilistic and Deterministic Graphical Models: Exact Algorithms by Morgan and Claypool publishers, 2013, has co-authored close to 200 research papers, and has served on the editorial boards of: Artificial Intelligence, the Constraint Journal, Journal of Artificial Intelligence Research (JAIR), and Journal of Machine Learning Research (JMLR). She is a Fellow of the American Association of Artificial Intelligence 1994, was a Radcliffe Fellow 2005–2006, received the 2007 Association of Constraint Programming (ACP) Research Excellence Award, and she is a 2013 ACM Fellow. She has been Co-Editor-in-Chief of Artificial Intelligence since 2011. She is also co-editor with Hector Geffner and Joe Halpern of the book Heuristics, Probability and Causality: A Tribute to Judea Pearl, College Publications, 2010.

## Special Track Invited Talks

Monday, May 21, 1:00 pm – 1:50 pm

**Kallirroi Georgila (University of Southern California / Institute for Creative Technologies)**

### **Special Track on Applied Natural Language Processing**

#### **Title: Challenges in Reinforcement Learning of Negotiation Dialogue Policies**

**Abstract:** Natural language dialogue systems allow human users to interact with computers using language. The dialogue policy of a dialogue system specifies what dialogue move (also called “action”) the system should make given the dialogue context (also called “dialogue state”). Building hand-crafted dialogue policies is a hard task, and there is no guarantee that the resulting policies will be optimal. This issue has motivated the dialogue community to use statistical methods for automatically learning dialogue policies, the most popular of which is reinforcement learning. However, to date, reinforcement learning has mainly been used to learn dialogue policies in slot-filling applications (e.g., restaurant recommendation, flight reservation, etc.) largely ignoring other more complex genres of dialogue such as negotiation. This talk presents challenges in reinforcement learning of negotiation dialogue policies. In negotiation the dialogue state and action spaces can be huge which can make training infeasible. Furthermore, it is difficult to collect representative data to cover all possible ways a negotiation may unfold. Another challenge is that a good system should be able to perform well regardless of the setting (including against negotiators whose behavior has not been previously observed) which means good negotiation policies need to be generic. Also, good negotiators try to adapt their behaviors based on any changes or improvements in their interlocutors’ behaviors, which creates a need for learning in non-stationary environments. Finally, dialogue management for negotiation may be further complicated by speech recognition and natural language understanding errors due to the fact that in negotiation the language is not as formulaic as in slot-filling tasks. This talk presents approaches addressing these challenges.

**Biographical Sketch:** Kallirroi Georgila is a Research Assistant Professor at the University of Southern California (USC) Institute for Creative Technologies (ICT) and USC’s Computer Science Department. Her research interests include all aspects of spoken language processing with a focus on reinforcement learning of dialogue policies, expressive conversational speech synthesis, and speech recognition. She has served on the organizing, senior, and program committees of many conferences and workshops, including being General Co-Chair for SIGdial 2014, Mentoring Chair for SIGdial 2012 and 2013, Associate Chair for ICMI 2013, Area Chair for EACL 2012, and Technical Program Co-Chair for SemDial 2011. She currently serves as Vice President of SIGdial (the Special Interest Group on Discourse and Dialogue) and Technical Program Co-Chair for SLT 2018. Her research work has been funded by the U.S. Army Research Laboratory and the National Science Foundation.

Tuesday, May 22, 10:30 am – 11:20 am

**Lewis Frey (Hollings Cancer Center, United States)**

**Special Track on AI in Healthcare Informatics**

**Title: Artificial Intelligence Meets Precision Medicine**

**Abstract:** Precision medicine is about treating each patient as an individual with a personal history, exposure history and genomic uniqueness that impacts their outcomes. The scale of such an undertaking is beyond the capacity of individual clinicians and arguably beyond human capacities to process the information and determine relevant features that impact the health and well being of the patient. It is time to bring Artificial Intelligence to the forefront of clinical care through the processing and learning of clinically relevant models that are actionable in the healthcare setting. The Precision Medicine Initiative sets the stage for applying Artificial Intelligence in healthcare; Computer Science researchers are critical to deliver on the promise of actionable knowledge gleaned from large data sets combined with high computing power. This presentation will touch upon the state of the art in Precision Medicine and tie such efforts to the use of Artificial Intelligence in healthcare.

**Biographical Sketch:** Lewis Frey PhD develops novel algorithms and information systems for the purpose of discovery and data integration applicable to precision medicine. He has extensive experience working with virtual machine deployments in networks and in big data technology deployed within the Veterans Affairs (VA). In addition to applying novel machine learning to medical data, his information systems approach combines the accumulated wealth of knowledge that exists in medical record systems with the vast amounts of molecular data being captured with high-throughput measurement technologies. He has published on informatics method for representing glycans to speed discovery for translational science. He has active research in investigating the utility of novel similarity measures to conduct predictive analytics, developing a novel machine learning analysis techniques, and developing a novel data integration approach using ontological representations to combine data from multiple experiments.

Tuesday, May 22, 1:00 am – 1:50 am

**Santiago Ontañón (Drexel University, United States)**

**Special Track on Case-Based Reasoning**

**Title: Similarity Assessment for Structured Representations**

**Abstract:** Similarity assessment is one of the core concepts underlying any case-based reasoning systems, and many other artificial intelligence and machine learning approaches such as clustering or kernel methods. Moreover, although similarity assessment for feature vector representations, work on similarity assessment for structured representations is fragmented across different communities such as Inductive Logic Programming, graph matching, case-based reasoning and others, with little cross-pollination. This talk covers the basic concepts underlying similarity assessment for structured representations, as well as the state of the art and the open research challenges.

**Biographical Sketch:** Dr Santiago Ontañón is an associate professor in the Computer Science Department at Drexel University. His main research interests are game AI, case-based reasoning and machine learning, fields in which he has published more than 150 peer-reviewed papers. He obtained his PhD from the Autonomous University of Barcelona (UAB), Spain. Before joining Drexel University, he held postdoctoral research positions at the Artificial Intelligence Research Institute (IIIA) in Barcelona, Spain, at the Georgia Institute of Technology (GeorgiaTech) in Atlanta, USA, and at the University of Barcelona, Spain.



## **Reception and Awards**

Monday, May 21, 6:30pm – 9:00pm

Join us for dinner and presentations of the Best Paper, Best Student Paper, and Best Poster awards, and the Douglas D. Dankel II Award for service to the Florida Artificial Intelligence Research Society (FLAIRS).

### **Nominees for Best Paper:**

*Day 1: Session 1: Room B*

**Comparing Machine Learning Classification Approaches for Predicting Expository Text Difficulty**  
Renu Balyan, Kathryn McCarthy and Danielle McNamara

*Day 2: Session 1: Room C*

**Hybrid Learning Model with Barzilai-Borwein Optimization for Context-aware Recommendations**  
Felipe Soares Da Costa and Peter Dolog

*Day 2: Session 2: Room B*

**Reliable Uncertain Evidence Modeling in Bayesian Networks by Credal Networks**  
Alessandro Antonucci and Sabina Marchetti

### **Nominees for Best Student Paper:**

*Day 1: Session 2: Room A*

**Discovering Effective Tutorial Strategies in Human Tutorial Sessions**  
Nabin Maharjan, Vasile Rus and Dipesh Gautam

*Day 1: Session 3: Room D*

**Maintaining Ad-Hoc Communication Network in Area Protection Scenarios with Adversarial Agents**  
Jônatas Wehrmann, Mauricio Lopes and Rodrigo Barros

*Day 2: Session 1: Room C*

**Accurate and Diverse Recommendations using Item-Based SubProfiles**  
Mesut Kaya and Derek Bridge

### **Recipient of the Douglas D. Dankel II Award for service to the Florida Artificial Intelligence Research Society:**

**Hans Guesgen (Massey University, New Zealand)**

*Hans Guesgen is a longtime contributor to FLAIRS, as an author, track chair, program chair, and conference chair. FLAIRS-31 will mark his 18th FLAIRS paper in 23 years, starting with his first paper in FLAIRS-9 in 1996. He became involved in the organization of FLAIRS in 1999, when he became chair of the Special Track on Spatio-Temporal Reasoning at FLAIRS-12, which he organized until FLAIRS-21 in 2008. In 2009 and 2010 he was a program chair of FLAIRS-22 and FLAIRS-23, and was the conference chair of FLAIRS-24 in 2011. Hans' careful fiscal management and attention to detail as an organizer has made a strong contribution to the ongoing success for FLAIRS.*

## **FLAIRS Business Meeting**

St. Thomas Room

Wednesday, May 23, 12:00 pm – 12:45 pm

The FLAIRS business meeting is a chance for the FLAIRS attendees to discuss this year's conference as well as plans for future years. The organizers of FLAIRS-32, which will be held in May of 2019 in Sarasota, Florida, will be introduced. Everyone is welcome to attend.

## Day 1: Monday, May 21, 2018

**FLAIRS-31 Welcome, 8:45am – 9:00am**

**Zdravko Markov**

**Invited Talk (Room: Ballrooms B, C, D)**

**Chair: Vasile Rus**

9:00am

**Raymond Mooney**

University of Texas at Austin

**Robots that Learn Grounded Language Through Interactive Dialog**

### **BREAK, 10:00am – 10:30am**

**Monday, May 21, 10:00am – 11:45AM (Posters will remain up until 1:00pm)**

**Poster Session (St. Lucia/St. Martin Room)**

#### Short Paper Posters – Main Track

1. *Combining Qualitative and Quantitative Reasoning for Solving Kinematics Word Problems*  
Savitha Sam Abraham and Sowmya S Sundaram
2. *SkeletonScore: Guiding a semantic parser to better results by example*  
Ritwik Bose and James Allen
3. *Multivariate Conditional Outlier Detection: Identifying Unusual Input-Output Associations in Data*  
Charmgil Hong and Milos Hauskrecht
4. *Improving topic model visualization via Multi-dimensional scaling and cliques*  
King Ip Lin and Andrew Kim
5. *Tree Structured Multimedia Signal Modeling*  
Weicheng Ma, Kai Cao, Xiang Li and Sang Chin
6. *Improved Multi-Objective Binary Fish School for Feature Selection*  
Mariana Gomes Da Motta Macedo, Carmelo José Albanez Bastos Filho and Ronaldo Menezes
7. *A Robot to Provide Support in Stigmatizing Patient-Caregiver Relationships*  
Michael Pettinati and Ronald Arkin
8. *Real Time Tennis Match Tracking With Low Cost Equipment*  
Mihai Polceanu, Andreea-Oana Petac, Hassan Ben-Lebsir, Bruno Fiter and Cedric Buche
9. *Predicting Trouble Ticket Resolution*  
Kenneth Sample, Alan Lin, Brett Borghetti and Gilbert Peterson

10. *Consensus Mining – A Guided Group Decision Process for the German Coalition Negotiations*  
Klemens Schnattinger, Nadine Mueller and Heike Walterscheid
11. *WSCAN-TFP: Weighted SCAN Clustering Algorithm For Team Formation Problem in Social Networks*  
Kalyani Selvarajah, Amangel Bhullar, Ziad Kobti and Mehdi Kargar
12. *Non-Linear Quest Generation*  
Alex Stocker and Chris Alvin
13. *A Comparison of Reinforcement Learning Methodologies in Two-Party and Three-Party Negotiation Dialogue*  
Gang Xiao and Kallirroi Georgila
14. *Detecting Simpson's Paradox*  
Chenguang Xu, Sarah M. Brown and Christan Grant
15. *Chinese Relation Classification via Convolutional Neural Networks*  
Linrui Zhang and Dan Moldovan

#### Short Paper Posters – AI for Big Social Data Analysis

16. *Emoji-word Network Analysis: Sentiments and Semantics*  
Seyed Mohammad Mahdi Seyednezhad, Halley Fede, Isaiah Herrera and Ronaldo Menezes

#### Short Paper Posters – AI in Games, Serious Games, and Multimedia

17. *On-line Agent Detection of Goal Changes*  
Nathan Ball, Jason Bindewald and Gilbert Peterson

#### Short Paper Posters – AI for Digital Humanities

18. *A Survey of Group Decision Making Methods and Evaluation Techniques*  
Badria Alfurhood and Marius Silaghi

#### Short Paper Posters – Applied Natural Language Processing

19. *Defining Forensic Authorship Attribution for Limited Samples from Social Media*  
Robert Frye and David Wilson

#### Short Paper Posters – Autonomous Robots and Agents

20. *Inter-agent variation improves dynamic decentralized task allocation*  
Annie Wu and Cortney Riggs

#### Short Paper Posters – Case-Based Reasoning Track

21. *Content Selection for Time Series Summarization using Case-Based Reasoning*  
Neha Dubey, Sutanu Chakraborti and Deepak Khemani
22. *A Case-based Reasoning and Clustering Framework for the Development of Intelligent Agents in Simulation Systems*  
Marcos R. B. Lucca, Alcides G. Lopes Junior, Edison P. Freitas and Luis A. L. Silva

#### Short Paper Posters – Data Mining

23. *Subgroup Discovery in Sequential Databases*  
Rina Singh, Jeffery Graves and Douglas Talbert

#### Short Paper Posters – Intelligent Learning Technologies

24. *Predictive Models of User Performance for Marksmanship Training*  
Mary Jean Blink, Ted Carmichael, Jennifer Murphy and Michael Eagle
25. *Linkage Objects for Generalized Instruction in Coding (LOGIC)*  
Ted Carmichael, Mary Jean Blink, John Stamper and Elizabeth Gieske
26. *Improving Formative Feedback on Argument Graphs*  
Nancy Green, Kevin Walker and Somya Agarwal
27. *Reading recommendation system for ESL learners based on linguistic features*  
M. Zakaria Kurdi

#### Short Paper Posters – Recommender Systems

28. *A Multi-Domain Analysis of Explanation-Based Recommendation using User-Generated Reviews*  
Khalil Muhammad, Aonghus Lawlor and Barry Smyth
29. *Between Multi-Attribute Utility Decision Making and Recommender Systems: Transparent, Instantaneous, Local Recommendations for Sparse Data*  
James Schaffer, James Michaelis, Adrienne Raglin and Stephen Russell
30. *Context-Aware Mobile Recommendation By A Novel Post-Filtering Approach*  
Yong Zheng

#### Short Paper Posters – Uncertain Reasoning

31. *Looking for Invariant Operators Preserving Argumentation Semantics*  
Stefano Bistarelli, Francesco Santini and Carlo Taticchi
32. *Recognizing Human Interactions Using Group Feature Relevance in Multinomial Kernel Logistic Regression*  
Ouiza Ouyed and Mohand Said Allili

## Poster Abstracts Only

33. *A Survey about Machine Learning Algorithms in E-Commerce*  
Alla Abdella
34. *Value-aware Recommendation with Multiple Stakeholders*  
Himan Abdollahpouri, Robin Burke and Bamshad Mobasher
35. *Framing Impacts and Avoidance Techniques for Group Decision Support Systems*  
Badria Alfurhood and Marius Silaghi
36. *Can a computer learn from a natural conversation with humans?*  
Awrad Mohammed Ali and Avelino Gonzalez
37. *Models and Inference Techniques for diagnosis of embedded components*  
Timothy Atkinson and Marius Silaghi
38. *Bridging the gap between artificial and spiking neural networks*  
Sylvain Chartier
39. *Improving User Acceptability of Recommendations through Opinion Mining*  
Arman Dehpanah and Jonathan Gemmell
40. *Performance Evaluation of a Real-Time Clustering Algorithm*  
Gabriel Ferrer
41. *Hybrid Goal Selection and Planning in a Goal Reasoning Agent Using Partially Specified Preferences*  
Michael Floyd, Mark Roberts and David Aha
42. *eSense 2.0: Modeling Multi-Agent Biomimetic Predation with Multi-layered Reinforcement Learning*  
D. Michael Franklin and Derek Martin
43. *firstGlimpse: Learning How to Learn through Observation via Memory Modeling with Reinforcement Learning*  
D. Michael Franklin and Ryan Kessler
44. *Data Mining Approach to Estimate Field Popularity from the US College Scorecard Data*  
Shiromani Neerudu, Md Suruz Miah and Fazel Keshtkar
45. *Compensating for Rating Distribution through Percentile Transformation*  
Masoud Mansoury, Robin Burke and Bamshad Mobasher
46. *Genetic Algorithms on Tensor Network Contraction Order Finding*  
Reamonn Norat, Annie Wu, David Anekstein, Jonathan Jakes-Schauer and Pawel Wocjan
47. *The Game of Chicken and Bitcoin Trading*  
Marius Silaghi, Badria Alfurhood and Timothy Atkinson
48. *Fairness-Aware Recommendation Systems*  
Nasim Sonboli, Robin Burke and Farzad Eskandanian
49. *Comparing General and Domain-Specific LSA Classifiers in the Context of Virtual Internships*  
Zachari Swiecki, Vasile Rus, Zhiqiang Cai, Dipesh Gautam and David Williamson Shaffer
50. *Cooperation Protocols for Ad-hoc Robot Teams Composition in Labyrinth Exploration*  
Muntaser Syed, Marius Silaghi, Rajaa Rahil, Sam Kellar and Shakre Elmane
51. *Recognizing and Exemplifying Gender Bias in Online Articles*  
Khonzodakhon Umarova and Eni Mustafaraj
52. *Detecting Vehicular Patterns Using a Graph-Based Approach*  
Sirisha Velampalli, Lenin Mookiah and William Eberle
53. *An Analysis of WordNet's Coverage of Personality Disorder Terms Using A Personality Disorder Corpus*  
Morgan Wixted, Amanda Hicks and Mary Cate Espinosa

## LUNCH (Location: Ocean Deck Pavilion), 11:45am – 1:00pm

**Monday, May 21, 1:00pm – 2:15pm**

**Paper Session 1**

**Day 1: Session 1: Room A: Main Track - Labeling**

**Chair: Keith Brawner**

- 1:00 pm      *Learning to Identify Known and Unknown Classes: A Case Study in Open World Malware Classification*  
Mehadi Hassen and Philip Chan
- 1:25 pm      *Active Learning of Multi-Class Classifiers with Auxiliary Probabilistic Information*  
Yanbing Xue and Milos Hauskrecht
- 1:50 pm      *Alert Generation in Execution Monitoring Using Resource Envelopes*  
T. K. Satish Kumar, Hong Xu, Zheng Tang, Anoop Kumar, Craig Milo Rogers and Craig A. Knoblock

**Day 1: Session 1: Room B: Intelligent Learning Technologies**

**Chair: Mark Core**

- 1:00 pm      *Comparing Machine Learning Classification Approaches for Predicting Expository Text Difficulty*  
Renu Balyan, Kathryn McCarthy and Danielle McNamara
- 1:25 pm      *Task-specific Language Modeling for Selecting Peer-written Explanations*  
Eni Mustafaraj, Khonzodakhon Umarova, Franklyn Turbak and Sohie Lee
- 1:50 pm      *Data Mining for Adaptive Instruction*  
Alan Carlin, Chris Nucci, Evan Oster, Diane Kramer and Keith Brawner

**Day 1: Session 1: Room C: Semantic, Logics, Information Extraction and AI**      **Chair: Ismaïl Biskri**

- 1:00 pm      *Introducing Hypertension FACTS: Vital Sign Ontology Annotations in the Florida Annotated Corpus for Translational Science*  
Amanda Hicks, William Hogan, Carl Pepine, Nathan Boire, Chloe Herring and Selja Seppälä
- 1:25 pm      *A Resampling Approach for Imbalanceness on Music Genre Classification using Spectrograms*  
Vinicius Dias Valerio, Rodolfo Miranda Pereira, Yandre Maldonado E Gomes Da Costa, Diego Bertolini and Carlos Nascimento Silla Jr.
- 1:50 pm      *Including New Patterns to Improve Event Extraction Systems*  
Kai Cao, Xiang Li, Weicheng Ma and Ralph Grishman

**Day 1: Session 1: Room D: Applied Natural Language Processing**

**Chair: Fazel Keshtkar**

- 1:00 pm      Invited Talk: *Challenges in Reinforcement Learning of Negotiation Dialogue Policies*

Kallirroi Georgila

1:50 pm      *Exploiting Textual and Citation Information to Identify and Summarize Influential Publications*  
Mohamed A. Zahran and Amr Ebaid

### **BREAK, 2:15pm – 2:45pm**

**Monday, May 21, 2:45pm – 4:00pm**

**Paper Session 2**

**Day 1: Session 2: Room A: Main Track – Time Series Data**

**Chair: David Bisant**

2:45 pm      *Discovering Effective Tutorial Strategies in Human Tutorial Sessions*  
Nabin Maharjan, Vasile Rus and Dipesh Gautam

3:10 pm      *Characterization of Users by Using Hourly and Daily Spatio-temporal Patterns Extracted from GPS Trajectories*  
Marcello Tomasini, Carmelo Bastos-Filho and Ronaldo Menezes

3:35 pm      *Spatiotemporal Associative Classification for Satellite Image Time Series*  
Carlos Roberto Silveira Junior, Marilde Santos and Marcela Ribeiro

**Day 1: Session 2: Room B: AI in Games, Serious Games, and Multimedia    Chair: Michael Franklin**

2:45 pm      *Let Us Tell You a fAIble: Content Generation through Graph-Based Cognition*  
Vera Kazakova, Lauren Hastings, Andres Posadas, Lucas C. Gonzalez, Rainer Knauf, Klaus P. Jantke and Avelino J. Gonzalez

3:10 pm      *Identifying Niche Stage in MMORPGs Using Ensemble Classifier*  
Luiz Bernardo Martins Kummer, Julio Cesar Nievola and Emerson Paraiso

3:35 pm      *Virtual Reality Game Adaptation using Neurofeedback*  
Hamdi Ben Abdessalem, Marwa Boukadida and Claude Frasson

**Day 1: Session 2: Room C: Autonomous Robots and Agents**

**Chair: Roman Barták**

2:45 pm      *Maintaining Ad-Hoc Communication Network in Area Protection Scenarios with Adversarial Agents*  
Marika Ivanova, Pavel Surynek and Diep Thi Ngoc Nguyen

3:10 pm      *A Reinforcement Learning Approach to Autonomous Speed Control in Robotic Systems*  
Nima Aghli and Marco Carvalho

3:35 pm      *Intelligently Assisting Human-Guided Quadcopter Photography*  
Saif Alabachi and Gita Sukthankar



**Day 1: Session 2: Room D: Applied Natural Language Processing**

**Chair: Fazel Keshtkar**

- 2:45 pm      *Ambiguity aware Arabic document indexing and query expansion: a morphological knowledge learning-based approach*  
Nadia Soudani, Ibrahim Bounhas and Sawssen Ben Babbis
- 3:10 pm      *Long Short Term Memory based Models for Negation Handling in Tutorial Dialogues*  
Dipesh Gautam and Vasile Rus
- 3:35 pm      *Metaphor Detection by Deep Learning and the Place of Poetic Metaphor in Digital Humanities*  
Chris Tanasescu Margento, Vaibhav Kesarwani and Diana Inkpen

**BREAK, 4:00pm – 4:30pm**

**Monday, May 21, 4:30pm – 5:45pm**

**Paper Session 3**

**Day 1: Session 3: Room A: Main Track: Deep Learning**

**Chair: Vasile Rus**

- 4:30 pm      *Peer Group Metadata-Informed LSTM Ensembles for Insider Threat Detection*  
Jason Matterer and Daniel Lejeune
- 4:55 pm      *Evaluating Spatial Generalization of Deep Learning in Wind Vector Determination*  
Richard Mcallister and John Sheppard

**Day 1: Session 3: Room B: AI for Big Social Data Analysis**

**Chair: Eric Bell**

- 4:30 pm      *Aspect-based Sentiment Analysis Using Bitmask Bidirectional Long Short Term Memory Networks*  
Binh Do
- 4:55 pm      *Refugee and Immigration: Twitter as a Proxy for Reality*  
Firas Aswad and Ronaldo Menezes
- 5:20 pm      *Location-Based Twitter Sentiment Analysis for Predicting the U.S. 2016 Presidential Election*  
Brian Heredia, Joseph Prusa and Taghi Khoshgoftaar

**Day 1: Session 3: Room C: Autonomous Robots and Agents**

**Chair: Roman Barták**

- 4:30 pm      *A Complete Coverage Algorithm for 3D Structural Inspection using an Autonomous Unmanned Aerial Vehicle* Venkat Ramana Reddy Garlapati and Raj Dasgupta

- 4:55 pm      *Specialization vs. Re-Specialization: Effects of Hebbian Learning in a Dynamic Environment*  
Vera Kazakova and Annie Wu
- 5:20 pm      *Reasoning with Doxastic Attitudes in Multi-Agent Domains*  
Ben Wright and Enrico Pontelli

**Day 1: Session 3: Room D: Applied Natural Language Processing**

**Chair: Fazel Keshtkar**

- 4:30 pm      *Metaphor Detection by Deep Learning and the Place of Poetic Metaphor in Digital Humanities*  
Chris Tanasescu Margento, Vaibhav Kesarwani and Diana Inkpen
- 4:55 pm      *Self-Attention for Synopsis-based Multi-Label Movie Genre Classification*  
Jônatas Wehrmann, Mauricio Lopes and Rodrigo Barros

**Monday, May 22, 6:30pm – 9:00pm Reception & Awards**

**Location: Ocean Deck Pavilion**

Best paper, Best Student Paper, Best Poster Awards, Douglas D. Dankel II Award for service to FLAIRS

## Day 2: Tuesday, May 22, 2018

**FLAIRS-31 Updates, 8:45am – 9:00am**

**Zdravko Markov**

**Invited Talk (Room: Ballrooms B, C, D)**

9:00am

**Chair: Keith Brawner**

**Dr. Peter Wurman**

Vice-President of Engineering at Cogitai

**How Kiva Robots Disrupted Warehousing**

**BREAK: 10:00am – 10:30am**

**Tuesday, May 22, 10:30am – 11:45am**

**Paper Session 1**

**Day 2: Session 1: Room A: Main Track: Misc.**

**Chair: Mark Core**

10:30 am      *Impact of Random Number Generation on Parallel Genetic Algorithms*  
Vincent Cicirello

10:55 am      *Assessing persuasion in argumentation through emotions and mental states*  
Serena Villata, Sahbi Benlamine, Elena Cabrio, Claude Frasson and Fabien Gandon

11:20 am      *Improved Manipulation Algorithms for District-based Elections*  
Ramoni Lasisi

**Day 2: Session 1: Room B: Uncertain Reasoning**

**Chair: Karim Tabia**

10:30 am      *The Matrix Approach for Weighted Argumentation Frameworks*  
Stefano Bistarelli, Alessandra Tappini and Carlo Taticchi

10:55 am      *Analysis of Jeffrey's rule of conditioning in an imprecise probabilistic setting*  
Karim Tabia

11:20 am      *Using Neural Networks to Include Semantic Information into Classification*  
Eduardo Ribeiro, Marcos Batista, Amar Daoud and Eraldo Ribeiro

**Day 2: Session 1: Room C: Recommender Systems****Chair: Nadia Najjar**

- 10:30 am      *Accurate and Diverse Recommendations using Item-Based SubProfiles*  
Mesut Kaya and Derek Bridge
- 10:55 am      *Hybrid Learning Model with Barzilai-Borwein Optimization for Context-aware Recommendations*  
Felipe Soares Da Costa and Peter Dolog
- 11:20 am      *Towards Bridging the Gap between Manufacturer and Users to Facilitate Better Recommendation*  
Anbarasu Sekar and Sutanu Chakraborti

**Day 2: Session 1: Room D: AI in Healthcare Informatics****Chair: Doug Talbert**

- 10:30 am      *Invited Talk: Artificial Intelligence Meets Precision Medicine*  
Lewis Frey
- 11:20 am      *Aiding Remote Diagnosis with Text Mining*  
Rebecca Hellström Karlsson, Vinutha Magal Shreenath and Sebastiaan Meijer

**LUNCH (Location: Ocean Deck Pavilion): 11:45am – 1:00pm****Tuesday, May 22, 1:00pm – 2:15pm****Paper Session 2****Day 2: Session 2: Room A: Main Track: Theory****Chair: Hans Guesgen**

- 1:00 pm      *Towards Foundations of Agents Reasoning on Streams of Percepts*  
Özgür Lütfü Özcep and Ralf Möller
- 1:25 pm      *Making Belnap's "Useful 4-Valued Logic" Useful*  
Geoff Sutcliffe, Francis Jeffry Pelletier and Allen Hazen
- 1:50 pm      *Partial (Neighbourhood) Singleton Arc Consistency for Constraint Satisfaction Problems*  
Richard Wallace

**Day 2: Session 2: Room B: Room B: Uncertain Reasoning****Chair: Karim Tabia**

- 1:00 pm      *Decision Support Core System for Cancer Therapies Using ASP-HEX*  
Andre Thevapalan, Gabriele Kern-Isberner, Diana Howey, Christoph Beierle, Ralf Georg Meyer  
and Mathias Nietzsche

- 1:25 pm      *Comparing Approaches to Qualitative Data Mining*  
Richard Niland, Christian Eichhorn and Gabriele Kern-Isberner
- 1:50 pm      *Reliable Uncertain Evidence Modeling in Bayesian Networks by Credal Networks*  
Alessandro Antonucci and Sabina Marchetti

**Day 2: Session 2: Room C: Case-Based Reasoning**

**Chair: Michael W. Floyd**

- 1:00 pm      *Invited Talk - Similarity Assessment for Structured Representations*  
Santiago Ontañón
- 1:50 pm      *An Optimal Footprint Method for Case-Base Maintenance*  
Ditty Mathew and Sutanu Chakraborti

**Day 2: Session 2: Room D: AI in Healthcare Informatics**

**Chair: Doug Talbert**

- 1:00 pm      *Using Machine Learning to Facilitate the Delivery of Person Centered Care in Nursing Homes*  
Gerald Gannod, Katherine Abbott, Kimberly Van Haitsma, Nathan Martindale, Rachel Kaczka Jennings and Chelsey Long
- 1:25 pm      *Cognitive Health Prediction on the Elderly Using Sensor Data in Smart Homes*  
Ramesh Paudel, Kimberlyn Dunn, William Eberle and Danielle Chaung
- 1:50 pm      *Detecting Harmful Hand Behaviors with Machine Learning from Wearable Motion Sensor Data*  
Lingfeng Zhang and Philip Chan

**BREAK, 2:15pm – 2:45pm**

**Tuesday, May 22, 2:45pm – 4:00pm**

**Paper Session 3**

**Day 2: Session 3: Room A: Main Track: CNNs**

**Chair: Keith Brawner**

- 2:45 pm      *Sequential Recognition of Multifocal Image Pollen-Grain Sequences by Combining CNN and RNN*  
Amar Daood, Eraldo Ribeiro and Mark Bush
- 3:10 pm      *Soybean Plant Disease Identification Using Convolutional Neural Network*  
Serawork Wallelign, Mihai Polceanu and Buche Cedric
- 3:35 pm      *GAN-Based Realistic Face Pose Synthesis with Continuous Latent Code*  
Douglas M. Souza and Duncan D. Ruiz

**Day 2: Session 3: Room C: Case-Based Reasoning**

**Chair: Michael W. Floyd**

- 2:45 pm      *A Case-Based Reasoning Approach to Learning State-Based Behavior*  
Amrik Sacha Elapata Gunaratne, Babak Esfandiari and Ali Fawaz
- 3:10 pm      *The Enemy of my Enemy is my Friend: Class-to-class Weighting in K-nearest Neighbors Algorithm*  
Xiaomeng Ye
- 3:35 pm      *Feature Selection and Case-based Reasoning for Survival Analysis in Bioinformatics*  
Isabelle Bichindaritz, Charles Englebert, Leszek Kotula and Angelina Regua

**Day 2: Session 3: Room D: AI in Healthcare Informatics**

**Chair: Jerry Gannod**

- 2:45 pm      *Fraud Detection with a Limited Number of Known Fraudulent Medicare Providers*  
Richard Bauder, Taghi Khoshgoftaar and Amri Napolitano
- 3:10 pm      *The Detection of Medicare Fraud using Machine Learning Methods with Excluded Provider Labels*  
Richard Bauder and Taghi Khoshgoftaar

## Day 3: Wednesday, May 23, 2018

**FLAIRS-32 Information, 8:45am – 9:00am**

**Vasile Rus**

**Invited Talk (Room: Ballrooms B, C, D)**

**Chair: Roman Barták**

9:00am

**Rina Dechter**

Donald Bren School of Information and Computer Sciences, UC Irvine

**Probabilistic Reasoning Meets Heuristic Search**

### **BREAK, 10:00am – 10:30am**

**Wednesday, May 23, 10:30am – 11:45am**

**Session 1**

**Day 3: Session 1: Room A: Main Track: Tools**

**Chair: David Wilson**

10:30 am      *Amigo: a tool that helps consumer decision making in e-commerce*  
Fabiana Lorenzi and Andre Peres

10:55 am      *"How Was Your Weekend?" A Generative Model of Phatic Conversation*  
Hannah Morrison and Chris Martens

**Day 3: Session 1: Room C: Main Track: Anomalies**

**Chair: Bill Eberle**

10:30 am      *Using Spatio-Temporal Anomalies to Detect Abnormal Behaviour in Smart Homes*  
Hans Guesgen, Dick Whiddett, Inga Hunter, Phoebe Elers, Caroline Lockhart, Amardeep Singh  
and Stephen Marsland

10:55 am      *Machine Learning from Observation to Detect Abnormal Driving Behavior in Humans*  
Josiah Wong, Lauren Hastings, Kevin Negy, Avelino Gonzalez, Santiago Ontañón and Yi-Ching  
Lee

11:20 am      *Using a Personalized Anomaly Detection Approach with Machine Learning to Detect Stolen  
Phones*  
Huizhong Hu and Philip Chan

**Day 3: Session 1: Room D: Main Track: Simulation**

**Chair: Annie Wu**

- 10:30 am      *Informal Team Assignment in a Pursuit-Evasion Game*  
David King, Jason Bindewald and Gilbert Peterson
- 10:55 am      *Efficient Real-Time Robot Navigation Using Incremental State Discovery Via Clustering*  
Olimpiya Saha and Prithviraj Dasgupta
- 11:20 am      *Learning Behavior from Limited Demonstrations in the Context of Games*  
Brandon Packard and Santiago Ontañón

**12:00 pm – 12:45 pm      FLAIRS BUSINESS MEETING (St. Thomas room)**

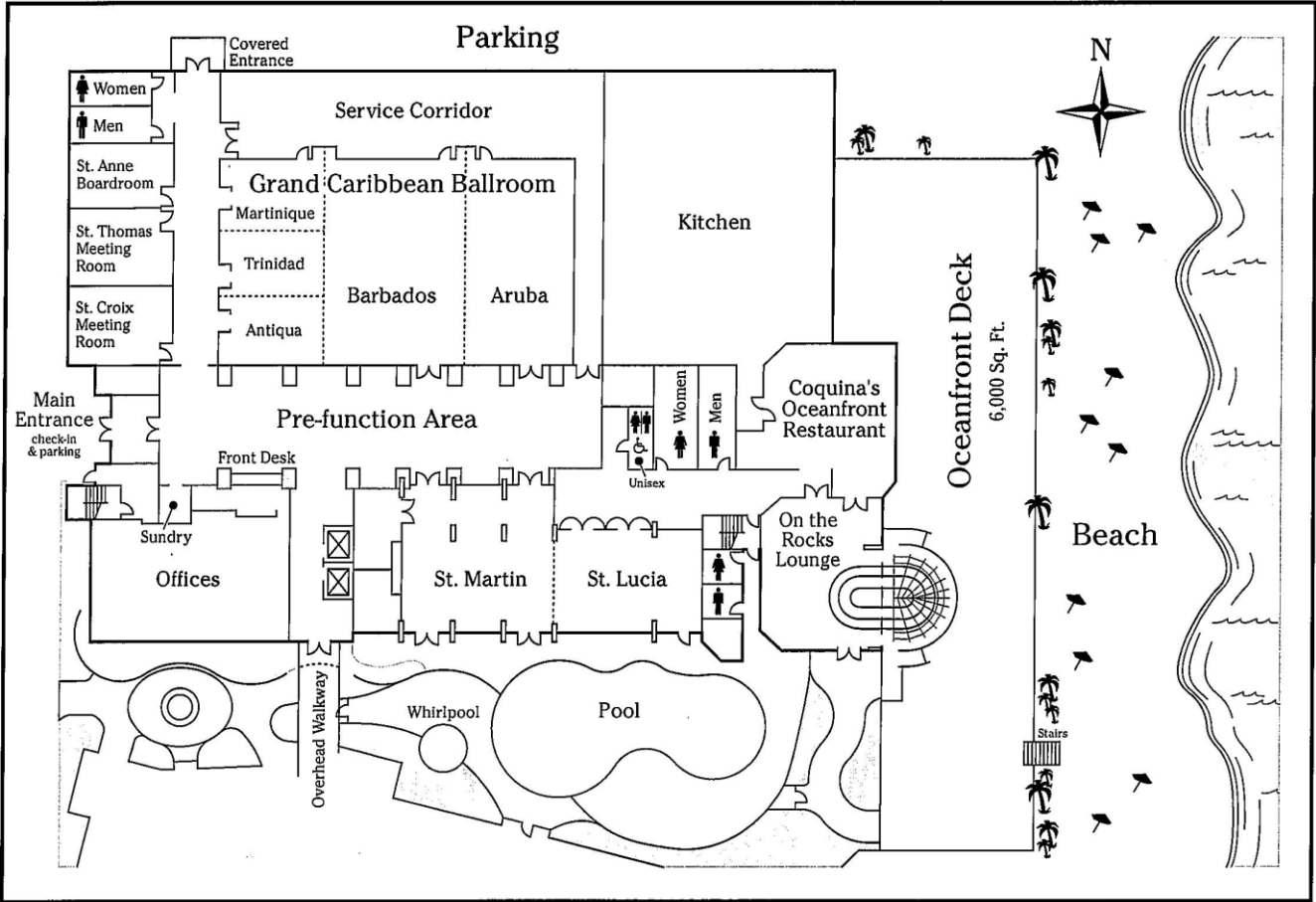
**END OF FLAIRS-31**

**We hope that you enjoyed the conference and Melbourne, Florida!**

**Join us for FLAIRS-32 in Sarasota (FL).  
<http://www.flairs-32.info>**



# Conference Center Map



TIME	ROOM	A: Barbados	B: St. Croix	C: St. Thomas	D: Antigua/Trinidad/Martinique
MONDAY (May 21, 2018)					
0800-0845	Continental Breakfast in Barbados				
0845-0900	Welcome				
0900-1000	Invited Talk - Raymond Mooney				
1000-1030	BREAK				
1030-1145	Poster Session in St. Lucia/St. Martin Room				
1145-1300	LUNCH on Ocean Deck Pavilion				
1300-1415	Main Track: Labeling	ILT	SLIE	ANLP - Invited Talk	
1415-1445	BREAK				
1445-1600	Main Track - TimeSeries	Games	ARA	ANLP	
1600-1630	BREAK				
1630-1815	MainTrack - Deep Learning	BigSoc	ARA	ANLP	
1815-1830	BREAK				
1830-2100	RECEPTION and AWARDS in the Ocean Deck Pavilion				
#REF!					
TUESDAY (May 22, 2018)					
0800-0845	Continental Breakfast in Barbados				
0845-0900	FLAIRS-31 Updates				
0900-1000	Invited Talk - Peter Wurman				
1000-1030	BREAK				
1030-1145	Main Track - Misc.	UR	RecSys	Health - Invited Talk	
1145-1300	LUNCH on Ocean Deck Pavilion				
1300-1415	Main Track - Theory	UR	CBR - Invited Talk	Health	
1415-1445	BREAK				
1445-1600	Main Track - CNNs		CBR	Health	
1600-1615	BREAK				
1615-1715	Special Event - Funding Panel				
#REF!					
WEDNESDAY (May 23, 2018)					
0800-0845	Continental Breakfast in Barbados				
0845-0900	FLAIRS-32 Updates				
0900-1000	Invited Talk - Rina Dechter				
1000-1030	BREAK				
1030-1145	Main Track: Tools		MainTrack: Anomalies	Main Track - Simulation	
1200-1245	FLAIRS Business Meeting (St. Thomas room)				
BigSoc	AI for Big Social Data Analysis		ILT	Intelligent Learning Tech.	
Games	AI in Games, Serious Games, and Multimedia		RecSys	Recommender Systems	
Health	AI in Healthcare Informatics		UR	Uncertain Reasoning	
ANLP	Applied Natural Language Processing		CBR	Case-Based Reasoning	
ARA	Autonomous Robots and Agents		SLIE	Semantic, Logics, Info. Extraction and AI	

## **ACKNOWLEDGMENTS**

**We would like to extend special thanks to:**

**The FLAIRS organization  
AAAI**