



AIME 2017 16th Conference on Artificial Intelligence in Medicine
Vienna, Austria June 21-24, 2017



AIME17 PROGRAM

	21.6.	22.6.	23.6.	24.6.
08:00-09:00	Main Lobby Registration	Main Lobby Registration	Main Lobby Registration	Main Lobby Registration
09:00-10:00	Savoyen			
10:00-11:00	Tutorial 1	Main Conference	Main Conference	WS 1+2
11:00-12:00	Tutorial 3			WS 3
12:00-13:00				WS 4
13:00-14:00	Upper lobby Lunch	Upper lobby Lunch	Upper lobby Lunch	Upper lobby Lunch
14:00-15:00	Savoyen Montléart	Wilhelminen	Wilhelminen	Sachsen Rainer
15:00-16:00				
16:00-17:00	Tutorial 4	Main Conference	Main Conference	WS 1+2
17:00-18:00	Tutorial 5	D/C		WS 3
18:00-19:00		Sachsen AIME Board Meeting		
19:00-22:00		Garden or Upper Lobby Welcoming Reception	Restaurant Schnattl (1080, Lange G. 40) Conference Dinner	

21.06.2017

- 09:00 - 13:00 **Tutorial 1.** Ameen Abu-Hanna: *Evaluation of Prediction models in Medicine*
- 09:00 - 13:00 **Tutorial 2.** Bjorn Schuller, Bodgan Vlasenko and Hesam Sagha: *Latest speech & signal processing for affective and behavioral computing in mHealth*
- 09:00 - 13:00 **Tutorial 3.** Jeroen de Bruin and Klaus-Peter Adlassnig: *Clinical fuzzy control systems and fuzzy automata with HL7's clinical decision support standard: The Fuzzy Arden Syntax*
- 13:00 - 14:00 Lunch Break
- 14:00 - 18:00 **Tutorial 4.** Stéphane Meystre, Meliha Yetisgen, Scott DuVall and Hua Xu: *Natural Language Processing for Clinical Information Extraction*
- 14:00 - 18:00 **Tutorial 5.** Francisco Javier Diez and Manuel Luque: *Medical Decision Analysis with Probabilistic Graphical Models*

14:00 - 18:00

Doctoral Consortium (John Holmes)

sponsored by the AIJ Division of the IJCAI organization

(<http://www.ijcai.org/aijd>)

- **Naiara Muro Amuchastegui:** *Development of an advanced clinical decision support system: Enriching the guideline-based knowledge with experience*
Vicomtech-IK4, Vicomtech-IK4, eHealth and Biomedical Applications, Donostia-San Sebastian, Spain; Biodonostia, Donostia-San Sebastian, Spain; Sorbonne Universités, UPMC, INSERM, LIM-ICS, Paris, France
[Discussants: Lucia Sacchi and Mor Peleg]
- **Carmen M. Yago:** *Building probabilistic graphical models with Bayesian inference techniques*
Department of Artificial Intelligence, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain
[Discussants: Allan Tucker and Riccardo Bellazi]
- **Francesca Zerbatò:** *Intertwining processes and data: Modeling the information perspective of knowledge-intensive healthcare processes*
Department of Computer Science, University of Verona, Verona, Italy
[Discussants: Yuval Shahar and Mor Peleg]
- **Lucas E. S. Oliveira:** *Summarization of clinical narratives from chronic-disease patients*
Pontifícia Universidade Católica do Paraná, Curitiba, Paraná, Brasil
[Discussants: Lucia Sacchi and Yuval Shahar]
- **Bernardo Cánovas-Segura:** *Multiuser Proactive Hybrid CDSS for Antibiotic Management in a Hospital Environment*
Computer Science Faculty – Universidad de Murcia – Spain
[Discussants: David Riaño and Riccardo Bellazzi]
- **Mina Rezaei:** *Deep learning for medical image analysis,*
Hasso Plattner Institute, Potsdam, Germany
[Discussants: David Riaño and Allan Tucker]

22.06.2017

- 09:00 - 09:15 **Opening Ceremony**
Annette ten Teije & Christian Popow
- 09:15 - 10:15 **Invited Talk 1**
Introduction: Lucia Sacchi
Stefan SCHULZ: *Annotating clinical narratives with SNOMED CT: The thorny way towards interoperability of clinical routine data*
[Sponsored by ECCAI]
- 10:15 - 10:40 **Session 1: Ontologies and Knowledge Representation**
Chair: Lucia Sacchi

Manuel Quesada-Martínez and Jesualdo Tomás Fernández-Breis: *Studying the reuse of content in biomedical ontologies: An axiom-based approach*
- 10:40 - 11:10 *Break*
- 11:10 - 12:30 **Session 1 ctd.: Ontologies and Knowledge Based Reasoning**
Chair: Mor Peleg

Melissa Mary, Lina F. Soualmia, Xavier Gansel, Karlsson Daniel and Schulz Stefan: *Ontological Representation of Laboratory Test Observables: Challenges and Perspectives in the SNOMED CT Observable Entity Model Adoption*

Hela Sfar, Nathan Ramoly, Amel Bouzeghoub and Béatrice Finance: *CAREDas: Context and Activity Recognition Enabling Detection of Anomalous Situation*

Szymon Wilk, Adi Fux, Martin Michalowski, Mor Peleg and Pnina Soffer: *Using Constraint Logic Programming for the Verification of Customized Decision Models for Clinical Guidelines*

Zhisheng Huang, Jie Yang, Frank Van Harmelen and Qing Hu: *Constructing Disease-centric Knowledge Graphs: a case study for depression^a*

- 12:30 - 12:50 Demo papers
Chair: Milos Hausknecht
- Stéphane Meystre: *Semi-Automated Ontology Development and Management System Applied to Medically Unexplained Syndromes in the U.S. Veterans Population*
 - Roberto Gatta: *pMineR: An Innovative R Library for Performing Process Mining in Medicine*
 - Manuel Arias, Miguel A. Artaso, Iñigo Bermejo and Francisco J. Díez, Manuel Luque and Jorge Pérez-Martín: *Advanced algorithms for medical decision analysis. Implementation in OpenMarkov*
 - Elisa Salvi: *A platform for targeting cost-utility analyses to specific populations*
- 12:50 - 14:15 *Lunch Break, Posters 1 & Demos*
- 13:00 - 14:00 AIIM Editorial Board Meeting
- 14:15 - 15:20 **Session 2: Bayesian Methods**
Chair: Riccardo Bellazzi
- Pedro Pereira Rodrigues, Daniela Ferreira-Santos, Ana Silva, Jorge Polonia and Ines Ribeiro-Vaz: *Implementing guidelines for causality assessment of adverse drug reaction reports: a Bayesian network approach*
- Wolfgang Fruehwirt, Pengfei Zhang, Matthias Gerstgrasser, Dieter Grossegger, Reinhold Schmidt, Thomas Benke, Peter Dal-Bianco, Gerhard Ransmayr, Leonard Weydemann, Heinrich Garn, Markus Waser, Michael Osborne and Georg Dorffner: *Bayesian Gaussian process classification from event-related brain potentials in Alzheimer's disease*
- Elisabetta Sauta, Andrea Demartini, Francesca Vitali, Alberto Riva and Riccardo Bellazzi: *Data fusion approach for learning transcriptional Bayesian Networks^a*
- Simon Rabinowicz, Arjen Hommersom, Raphaela Butz and Matt Williams: *A Prognostic Model of Glioblastoma Multiforme using Survival Bayesian Networks^a*
- James O' Neill, Michael Madden and Eamon Dolan: *Accurate Bayesian Prediction of Cardiovascular-Related Mortality Using Ambulatory Blood Pressure Measurements^a*

- 15:20 - 15:50 *Break & Posters 1*
- 15:50 -17:55 **Session 3: Temporal Methods**
Chair: Carlo Combi, Paolo Terenzini
- Mate Bešteek, Dragi Kocev, Sašo Džeroski, Andrej Brodrik and Rade Iljaž: *Modelling Time-series of Glucose Measurements from Diabetes Patients using Predictive Clustering Trees*
- Zuzana Roštáková, Georg Dorffner, Önder Aydemir and Roman Rosipal: *Estimation of Sleep Quality by Using Microstructure Profiles*
- Anita Valmarska, Dragana Miljkovic, Spiros Konitsiotis, Dimitris Gatsios, Nada Lavrač and Marko Robnik-Sikonja: *Combining multitask learning and short time series analysis in Parkinson's disease patients stratification*
- Siqi Liu, Adam Wright and Milos Hauskrecht: *Change-Point Detection Method for Clinical Decision Support System Rule Monitoring*
- Germain Forestier, Francois Petitjean, Pavel Senin, Fabien Despinoy and Pierre Jannin: *Discovering Discriminative and Interpretable Patterns for Surgical Motion Analysis*
- 18:00 - 19:00 **AIME Board Meeting^b**
- 18:15 - 19:00 Tony Solomonides: *Discovery and optimization of diagnostic pathways* broadcasted live from the IEEE International Symposium on Computer-Based Medical Systems - IEEE CBMS 2017, Thessaloniki
- 19:00 - 22:00 **Welcoming Reception (at Conference Center)**

23.6.2017

- 09:00 - 10:00 **Invited Talk 2**
Introduction: John Holmes
Ken J. Barker: *Collaborative, Exploratory Question Answering against Medical Literature*
[Sponsored by ECCAI]
- 10:00 - 10:30 **Session 4: Natural Language Processing**
Chair: John Holmes
Alfonso Gerevini, Alberto Lavelli, Alessandro Maffi, Roberto Maroldi, Anne-Lyse Minard, Ivan Serina and Guido Squassina: *Automatic Classification of Radiological Reports for Clinical Care*

Elisa Salvi, Enea Parimbelli, Alessia Basadonne, Natalia Viani, Anna Cavallini, Giuseppe Micieli, Silvana Quaglini and Lucia Sacchi: *Exploring IBM Watson to extract meaningful information from the list of references of a clinical practice guideline^a*
- 10:30 - 11:00 *Break*
- 11:00 - 12:35 **Session 4 ctd.: Natural Language Processing**
Chair: Pierre Zweigenbaum
Gia-Hung Nguyen, Lynda Tamine, Laure Soulier and Nathalie Bricon-Souf: *Learning concept-driven document embeddings for medical information search*

Meliha Yetisgen and Lucy Vanderwende: *Automatic Identification of Substance Abuse from Social History in Clinical Text*

Elena Viorica Epure, Camille Salinesi and Rebecca Deneckere: *Mining Perceived Intentions of the Public Health-Related Communication on Twitter*

Natalia Viani, Timothy Miller, Dmitriy Dligach, Steven Bethard, Carlo Napolitano, Silvia Priori, Riccardo Bellazzi, Lucia Sacchi and Guergana Savova: *Recurrent Neural Network Architectures for Event Extraction from Italian Medical Reports^a*

Vincent Claveau, Lucas Emanuel Silva Oliveira, Guillaume Bouzillé, Marc Cuggia, Claudia Maria Cabral Moro and Natalia Grabar: *Numerical eligibility criteria in clinical protocols: annotation, automatic detection and interpretation^a*

Nicholas Cummins, Bogdan Vlasenko, Hesam Sagha and Bjoern Schuller: *Enhancing speech-based depression detection through gender dependent vowel level formant features^a*

Margherita Zorzi, Carlo Combi, Gabriele Pozzani, Elena Arzenton and Ugo Moretti: *A Co-occurrence Based MedDRA Terminology Generation: Some Preliminary Results^a*

12:35 - 14:00 *Lunch Break & Posters 2*

14:00 - 15:40 **Session 5: Healthcare processes**
Chair: Yuval Shahar

Carlo Combi, Barbara Oliboni and Francesca Zerbato: *Towards dynamic duration constraints for therapy and monitoring tasks*

Yann Dauxais, Thomas Guyet, David Gross-Amblard and André Happe: *Discriminant chronicles mining. Application to care pathways analytics*

Mor Peleg, Tiffany Leung, Manisha Desai and Michel Dumontier: *Is crowdsourcing patient-reported outcomes the future of evidence-based medicine? A case study of back pain*

Luca Canensi, Giorgio Leonardi, Stefania Montani and Paolo Terenziani: *Multi-level interactive medical process mining^a*

Thomas Guyet, Andre Happe and Yann Dauxais: *Declarative sequential pattern mining of care pathways^a*

Stefania Montani, Manuel Striani, Silvana Quaglini, Anna Cavallini and Giorgio Leonardi: *Knowledge-based trace abstraction for semantic process mining^a*

Miquel Bofill, Marcos Calderón, Francesc Castro, Esteve Del Acebo, Pablo Delgado, Marc Garcia, Marta García, Marc Roig, María O. Valentín and Mateu Villaret: *The Spanish kidney exchange model: study of computation-based alternatives to the current procedure^a*

Yann Rivault, Nolwenn Le Meur and Olivier Dameron: *A Similarity Measure Based on Care Trajectories as Sequences of Sets^a*

15:40-16:05

Session 6: Machine Learning

Chair: Gregor Štiglic

Andreas Karwath, Markus Hubrich and Stefan Kramer: *Convolutional Neural Networks for the Identification of Regions of Interests in PET Scans: A Study of Representation Learning for Diagnosing Alzheimer's Disease^a*

Pedro Bibiloni, Manuel González-Hidalgo and Sebastià Massanet: *Skin Hair Removal in Dermoscopic Images using Soft Color Morphology^a*

Michiel Meulendijk, Marco Spruit and Sjaak Brinkkemper: *Risk Mediation in Association Rules: The Case of Decision Support in Medication Review^a*

Devendra Dhani, Ameet Soni, David Page and Sriraam Natarajan: *Identifying Parkinson's Patients : A Functional Gradient Boosting Approach^a*

Cosima Prahm, Alexander Schulz, Benjamin Paaßen, Oskar Aszmann, Barbara Hammer and Georg Dorffner: *Echo State Networks as Novel Approach for Low-Cost Myoelectric Control^a*

16:05 - 16:35

Break & Posters 2

16:35 - 17:50

Session 6 ctd.: Machine Learning

Chair: Niels Peek

Miriam Seoane Santos, Jastin Soares, Pedro Henriques Abreu, Helder Araújo and João Santos: *Influence of Data Distribution in Missing Data Imputation*

Yasunori Yamada and Masatomo Kobayashi: *Detecting Mental Fatigue from Eye-Tracking Data Gathered While Watching Video*

Joaquim De Moura, Jorge Novo, José Rouco, Manuel G. Penedo and Marcos Ortega: *Automatic identification of intraretinal cystoid regions in Optical Coherence Tomography*

18:00-18:20 **Awards and Closing Session** (Annette ten Teije, Christian Popow,
and Szymon Wilk)

20:00-24:00 **Congress Dinner at Restaurant Schnattl^c**

^a Short Paper, ^b Board Members, ^c see Voucher

24.6.2017

09:00 - 18:00 **Workshops**

Combined Workshop 1. & 2. David Riaño, Richard Lenz, Manfred Reichert, and Mor Peleg: *Joint International Workshop KR4HC 2017 - ProHealth 2017* and

Kerstin Denecke, Yihan Deng, Thierry Declerck and Frank van Harmelen: *Second Workshop on Extracting and Processing of Rich Semantics from Medical Texts*

Session I. Keynote

Frank van Harmelen: *How linked (open?) data can benefit healthcare systems*

Session II. Temporal Analysis, Representation, and Simulation

Luca Piovesan, Paolo Terenziani, and Daniele Theseider Dupré: *Temporal conformance analysis and explanation on comorbid patients*

Paolo Terenziani, Antonella Andolina: *Representing and reasoning with probabilistic temporal distances for guideline interaction analysis*

Guenter Tusch and Shahrzad Eslamian: *Utilizing temporal genomic data for healthcare*

Lilian Mie Mukai Cintho, Claudia Moro, Lucia Sacchi, and Silvana Quaglini: *Representation of temporal constraints in clinical guidelines using openEHR archetypes and GDL*

David Riaño, and José Ramón Alonso: *A knowledge-based conceptual model to simulate circulatory shock*

Session III. Modeling and Decision Support. Data Analysis

Szymon Wilk, Dympna O'Sullivan, Martin Michalowski, Silvia Bonaccio, Wojtek Michalowski, Mor Peleg, and Marc Carrier: *A data- and expert-driven decision support framework for helping patients adhere to therapy: Psychobehavioral targets and associated interventions*

A. Bottrighi, L. Piovesan, and P. Terenziani: *A general framework for the distributed management of exceptions and comorbidities*

Arturo González-Ferrer, María Ángel Valcárcel, Henar González-Luengo, and Enea Parimbelli: *A label taxonomy to support collaborative formalization of computer-interpretable guidelines and classification of modeling issues*

Roberto Gatta, Jacopo Lenkowicz, Mauro Vallati, Eric Rojas, Andrea Damiani, Carlos Fernandez-Llatas, Lucia Sacchi, Bernardino De Bari, Arianna Dagliati, and Vincenzo Valentini: *Performance analysis of Markov chains-based models in process mining: A case study*

Christina Klüver and Christian Dahlmann: *A self-enforcing network for the analysis of fall cases in a University Hospital*

Session IV Natural Language Processing and Deep Learning

Yihan Deng, André Sander, Lukas Faulstich, and Kerstin Denecke: *Towards automatic clinical operation encoding (CHOP) with convolutional neural networks*

Salud María Jiménez-Zafra, M. Teresa Martín-Valdivia, M. Dolores, Molina-González, and L. Alfonso Ureña López: *Corpus annotation for aspect based sentiment analysis in medical domain*

Gerard van Oortmerssen, Stephan Raaijmakers, Maya Sappelli, Erik Boertjes, Suzan Verberne, Nicole Walasek, and Wessel Kraaij: *Analyzing cancer forum discussions with text mining*

Madeleine Kittner, Bariya Bajwa, Damian Rieke, Mario Lamping, Johannes Starlinger, and Ulf Leser: *Design of an information extraction pipeline for German clinical texts*

Workshop 3.

The Second Workshop on Artificial Intelligence for Diabetes

Organization: Beatriz López, Clare Martin and Pau Herrero Vinas
see also: <http://sots.brookes.ac.uk/~p0042050/aid2017/#schedule>

09:00 - 09:10	Introduction
09:10 - 10:00	Invited Speaker: M. Elena Hernando
10:00 - 10:15	Pau Herrero, Peter Pesl, Monika Reddy, Nick Oliver, and Pantelis Georgiou: <i>Automatic adjustment of basal insulin infusion rates in Type 1 Diabetes using run-to-run control and case-based reasoning</i>
10:15 - 10:30	Ferran Torrent-Fontbona, Beatriz Lopez, and Alejandro Pozo-Alonso: <i>A CBR-based bolus recommender system for type 1 diabetes</i>
10:30 - 11:00	<i>Break</i>
11:00 - 11:15	Arianna Dagliati, Lucia Sacchi, Valentina Tibollo, Giulia Cogni, Luca Chiovato, John H. Holmes, Riccardo Bellazzi: <i>T2DM phenotypes recognition by Careflow Mining</i>
11:15 - 11:30	Arianna Dagliati, Lucia Sacchi, Valentina Tibollo, Giulia Cogni, Luca Chiovato, Riccardo Bellazzi: <i>Drug purchases behavioral patterns to support clinical decisions in T2D patients</i>
11:30 - 11:45	Fabien Dubosson, Natalia Mordanyuk, Beatriz Lopez, Michael Schumacher: <i>Prediction of postprandial hypoglycemias from insulin intakes and carbohydrates: analysis and comparison between real and simulated datasets</i>
11:45 - 12:00	Aida Valls, Antonio Moreno, Domenec Puig, Emran Saleh, Jose Escorcia-Gutierrez, Jordina Torrents-Barrena, Pedro Romero-Aroca, Ramon Sagarra-Alamo, Sofia de la Riva-Fernandez: <i>A clinical decision support system for the diagnosis of Diabetic Retinopathy</i>
12:00 - 12:15	Daniel Brown, Claire Martin, D. Duce, Arantza Aldea, R. Harrison: <i>Towards a formal model of Type 1 Diabetes for Artificial Intelligence</i>

12:15 - 12:30	Mireya Munoz-Balbontin, Tjeerd V. olde Scheper, and Arantza Aldea: <i>Developing a Dynamic Bio-inspired Intelligent System to Support Diabetic Patients</i>
12:30 - 13:30	<i>Lunch Break</i>
13:30 - 14:30	Discussion: Demonstration and Requirements of an AID Repository
14:30 - 15:00	<i>Break</i>
15:00 - 16:00	Discussion about further collaborations and future editions of the workshop
16:00	<i>End of Workshop 3.</i>

Workshop 4.

Advanced predictive models in healthcare

Organization: Niels Peek, Gregor Štiglic, Nophar Geifman, Petra Povalej Brzan and Matthew Sperrin

Aljoša Vodopija, Miha Mlakar, Mitja Luštrek: *Predictive models to improve wellbeing of heart-failure patients*

Ivana Cace, John-Jules Meyer and Koen Böcker: *How to aggregate summary statistics to infer subgroup characteristics*

Peter Haddawy, Myat Su Yin, Tanawan Wisanrakkit, Rootrada Limsupavanich, Promporn Promrat and Saranath Lawpoolsri: *AIC-driven spatial hierarchical clustering: case study for Malaria prediction in Northern Thailand*

Awad Alyousef, Svetlana Nihtyanova, Chris Denton and Allan Tucker: *Nearest consensus clustering classification to identify subclasses of disease and predict disease*

Peter Haddawy, Myat Su Yin, Pongsatorn Chen, Thanaphon Kerdpholngam, Jedchayuth Surawatsatien and Saranath Lawpoo: *A Bayesian framework for integrating prediction and diagnosis - preliminary report*

Eitam Sheetrit, Nir Nissim, Denis Klimov, Lior Fuchs, Yuval Elovici, Yuval Shahar: *Temporal pattern discovery for accurate sepsis diagnosis in ICU patients*