

TABLE OF CONTENTS

| | |
|--------------------------------|----|
| 1. Welcome Message | 3 |
| 2. Murcia Town | 4 |
| 3. Useful Information | 6 |
| 4. Social Events | 9 |
| 5. Program at a Glance | 10 |
| 6. Complete Conference Program | 13 |
| 7. Invited Talks | 19 |
| 8. Poster Sesions | 20 |
| 9. Tutorials | 23 |
| 10. Workshops | 25 |
| 11. Doctoral Consortium | 29 |
| 12. Conference Organization | 31 |
| 13. Program Committee | 32 |
| 14. Attendees | 33 |
| 15. My Notes | 35 |

1. WELCOME TO AIME 2013

We are pleased to welcome you in Murcia (Spain) for the 14th Conference on Artificial Intelligence in Medicine.

In this edition, we have received 82 submissions from 24 different countries in 5 continents. Eventually, 18 long and 25 short papers were accepted for the main conference programme. As scientific education is essential in our community, this year we will also enjoy 3 informative tutorials and a doctoral consortium. Finally, 2 distinguished invited speakers and 2 challenging workshops enrich the AIME 2013 conference.

In this brochure, you will find useful information about the scientific programme, social events and the city of Murcia.

We would like to acknowledge the indispensable work done by the Program Committee and additional reviewers, as well as the organizers of workshops, tutorials and the doctoral consortium. We wish to thank the support provided by our sponsors to AIME 2013 and to EasyChair conference system.

On behalf of the organizing committee of the conference, we want to thank you for your participation and we wish you a great scientific, cultural and gastronomic week.

Roque Marín
Niels Peek

2.MURCIA TOWN

THE CONFERENCE TOWN: MURCIA, SPAIN

(Source: www.murciaturistica.es)



BASIC INFORMATION

The city of Murcia was founded in 831 by Abd-Al-Rahman II on a privileged location, in the centre of the Valley of the River Segura.

The city wall offers a good idea of the importance achieved by the city under **Arab rule**, and the remains of part of the wall are still visible in different places around the city; the wall originally measured 15 metres in height and had 95 towers. The importance of the city has also been evidenced by the numerous archaeological findings, such as the remains of a palace unearthed at the Las Claras Convent.

The **Christian** city has also left a profound mark on Murcia's urban physiognomy; two of its main arteries, La Platería and La Trapería, still reveal the intense guild activity that developed in the metropolis. However it was from the 16th century, and particularly the 18th century, onwards that Murcia achieved an urban splendour that led to its expansion beyond the city walls. It was during that period that the numerous churches - mainly **baroque** in style - that mark the entire urban landscape were built. These churches include La Merced, San Miguel, Santa Ana, Las Claras, Santo Domingo, Santa Eulalia and San Juan de Dios, which combine their artistic and architectural designs with an important pictorial and sculptural heritage, containing numerous important works, including most notably those produced by Francisco Salzillo.



The most important religious building in Murcia is its **Cathedral**, construction of which began at the end of the 14th Century; this building contains gothic elements, such as La Puerta de los Apóstoles, and La Capilla de los Vélez; renaissance architecture, showcased by the Junterón Chapel; and baroque architecture, including most notably its façade, conceived as a gigantic altarpiece by Jaime Bort, with its clever conjugation of sculpture and architecture. Also noteworthy is its tower, measuring 92 metres in height and built in different stages between the 16th and 18th centuries. The Cathedral is flanked by other eighteenth century buildings - the Episcopal Palace and the old Granary, known as El Almudí, both good exam-

ples of the construction boom that took place during the abovementioned period.

The streets and squares of Murcia also offer magnificent examples of 19th century architecture, such as the Town Hall, the Victoria Hotel, the Romea Theatre and particularly the Casino, built in 1847 and extended after 1902, and which contains decorations of great interest, such as its dance hall, the neo-nazarí (13th - 15th century Muslim dynasty in Granada) patio or the library, as well as its façade decorated by magnificent sculptures. All this artistic and historic wealth is on display at the city's museums, such as the Archaeological Museum, the Fine Arts Museum or the Salzillo Museum, where visitors can enjoy the procession images created by this skilled Murcian maker of images for the procession of the morning of Good Friday, as well as his famous Nativity Scene, which marks the start of one of the oldest traditions in Murcia.

The Hydraulic Museum offers another clear



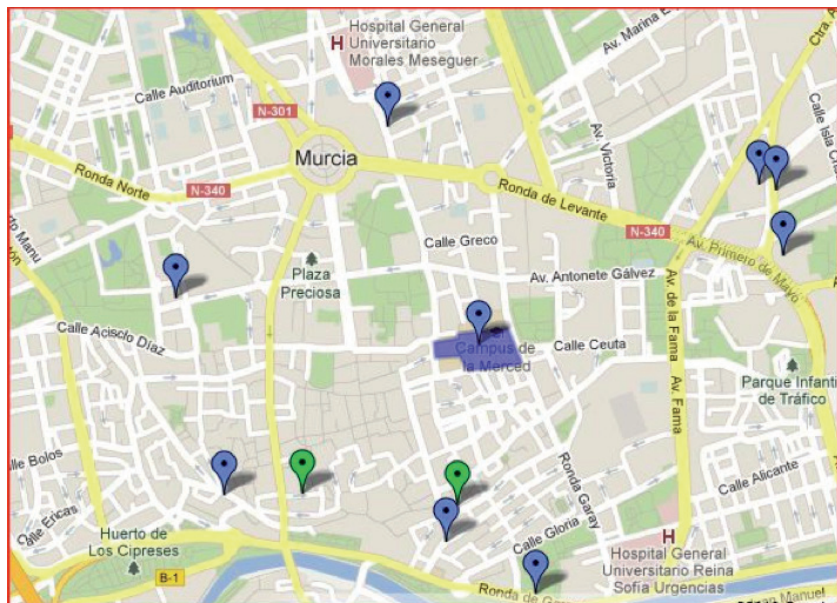
example, just like the bridges that cross the river and particularly the Old Bridge, of the close relationship that exists between Murcia and the River Segura.

Murcian art is not limited to the city boundaries. Magnificent examples of baroque architecture can be found at the La Fuensanta Chapel or the Monastery of San Jerónimo, which is known as El Escorial Murciano, The Escorial of Murcia.

However, Murcia, rather than remain anchored in its past, has developed into a modern city, equipped with all the necessary facilities and infrastructures, an extensive university complex and an Auditorium and Congress Centre, which, in combination with its hotel facilities, make it the ideal place for holding meetings and events of all types.

3. USEFUL INFORMATION

HOTELS AROUND THE CONFERENCE AREA AND MAP



HOTEL NELVA 4 ****

Avda. Primero de Mayo, 9. 30006 - Murcia
T +34 968 06 02 00
F +34 968 06 02 02
recepcion@hotelnelva.es
www.hotelnelva.com

HOTEL RINCÓN DE PEPE 4***

C/ Apóstoles, 34. 30001 - Murcia
T +34 968 21 22 39
F +34 968 22 17 44
nhrincondepepe@nh-hotels.com
www.nh-hotels.com

HOTEL SILKEN 7 CORONAS 4****

Paseo de Garay, 5 30003 Murcia
968 21 77 74
www.hoteles-silken.com

HOTEL HESPERIA 3***

Calle de la Madre de Dios, 4. 30004 Murcia
Tel. +34 968 217 789
Reservas: +34 902 570 368
hotel@hesperia-murcia.com

HOTEL ARCO DE SAN JUAN 3 ***

Plaza ceballos, 10 30003 Murcia
T +34 968 21 04 55
F +34 968 22 08 09
reservas@arcosanjuan.com
www.arcosanjuan.com

HOTEL CHURRA 3***

Avda. Marqués de los Vélez, 12. 30008 Murcia
T +34 968 23 84 00
F +34 968 23 77 93
hotelechurra@elchurra.net
www.elchurra.net

RESTAURANTS AROUND THE CONFERENCE AREA

| NAME | STREET | CUISINE | OPENING HOURS |
|-------------------------------|---------------------------|---------------|--|
| El Churra | Obispo Sancho Dávila, s/n | Local | 13:30-17:00 19:00-00:00 |
| Hispano | C/ Radio Murcia, 3 | Local | 13:30-16:30 20:00-23:30 |
| La Parranda | Plaza San Juan,s/n | Local | 13:30-16:30 20:00-24:00 |
| La pequeña taberna | Plaza San Juan, 8 | Local | 13:30-16:00 20:00-00:00 |
| Los Churrascos | Plaza San Juan s/n | Local | Tue-Wen-Sun 9:00-16:00 Thu-Fri- Sat 9:00-16:00 20:00-23:00 Monday Closed |
| Oro Negro | Avda.Primer de Mayo, 9 | Mediterranean | 13:30-16:00 20:30-00:00 |
| Palacete Rural La Seda | Vereda del Catalán, s/n | Local | 13:30-16:00 |
| Pura Cepa | Pl. Cristo del Rescate | Local | 13:30-16:30 20:00-00:00 |
| Temporáneo | Pl. Apostoles, 4 | Modern | 13:30-16:30 20:30-23:30 |

INSTRUCTION FOR PRESENTER

How to get ready for your session:

Before the session starts, please, contact the session chair and check that your slides work. AIME staff will be there to help you.

Room equipment:

Rooms are be equipped with one desktop with Windows 7, MS Office, Acrobat PDF reader, USB flash drive and VGA video input.

If you plan to use your own laptop, please, check if its video output matches the input room (VGA) or if you need an adapter.

Presentations:

Long presentations (25 min):

- 20 minutes for presentation.
- 5 minutes for discussion.

INSTRUCTION POSTER PRESENTER

Short presentations (5 min):

- 5 minutes for presentation (discussions during the poster session).
- Maximum poster size: 841mm wide by 1200mm tall.

INTERNET ACCESS

Network : um-aime

Password: aime2013

4. SOCIAL EVENTS

THURSDAY, MAY 30

Welcome cocktail

Welcome cocktail during the poster session will take place at the wonderful cloisters of the Faculty of Laws that date from the XVII century.

Murcia Tour.

After the welcome cocktail, we will have a guided tour around the baroque city of Murcia.

FRIDAY, MAY 31

Gala dinner will take place in the restaurant on the roof of Arco de San Juan Hotel.

SATURDAY, JUN 1

Half-day tour to the seaside town of Cartagena.
(tickets available at the registration desk)

5. PROGRAM AT A GLANCE

- **Conference Rooms and Locations**

AIME will be hold at the Campus La Merced of the University of Murcia.

Paraninfo (main hall)

Salón de Grados (room at the cloisters)

Sala de Juntas (room at the cloisters)

- **Coffee breaks** will be served in the Campus Square.

- **Lunches** will be organized at the restaurant of Hesperia Hotel
(except on Wednesday – lunch will be at La Merced cafeteria within the campus).



GENERAL SCHEDULE

| | Wed. | Thur. | Frid. | Sat. | |
|-------|-------------------|-------------------------|-------------------------|--------------|------------------------|
| 8:30 | Registration | Registration | | Registration | |
| 8:45 | | | Registration | | |
| 9:00 | Tutorial #2 | OPENING CEREMONY | | | |
| 9:15 | | | | | |
| 9:30 | | D. ARONSKY INVITED TALK | H. HERMENS INVITED TALK | Workshop#1 | Workshop#2 |
| 9:45 | Coffee Break | | | | |
| 10:00 | | | | | |
| 10:15 | | | | | |
| 10:30 | Tutorial #1 | Session1 | Session 6 | | |
| 10:45 | | | | | |
| 11:00 | | Coffee Break | Coffee Break | Coffee Break | Coffee Break + Posters |
| 11:15 | | | | | |
| 11:30 | Coffee Break | | | | |
| 11:45 | | Session2 | Session 7 | Workshop#1 | Workshop#2 |
| 12:00 | | | | | |
| 12:15 | | | | | |
| 12:30 | Tutorial #3 | | | | |
| 12:45 | | | | | |
| 13:00 | | | | | |
| 13:15 | | | | | |
| 13:30 | | Lunch Break | Lunch Break | Lunch Break | Lunch Break |
| 13:45 | | | | | |
| 14:00 | Lunch Break | | | | |
| 14:15 | | | | | |
| 14:30 | | | | | |
| 14:45 | | Session 3 | Session 8 | Workshop#1 | Workshop#2 |
| 15:00 | DOCTORAL CONSORT. | Session 4 | | | |
| 15:15 | | | | | |
| 15:30 | | | | | |
| 15:45 | | Coffee Break | | | |
| 16:00 | | | | | |
| 16:15 | | | Coffee Break | Coffee Break | Coffee Break |
| 16:30 | Coffee Break | | | | |
| 16:45 | | Session 5 | | | |
| 17:00 | | | | | |
| 17:15 | | | Session 9 | Workshop#1 | Workshop#2 |
| 17:30 | | BOARD MEETING | | | |
| 17:45 | DOCTORAL CONSORT. | | | | |
| 18:00 | | | | | |
| 18:15 | | | CLOSING CEREMONY | | |
| 18:30 | | | | | |
| 18:45 | | | | | |
| 19:00 | | POSTERS + COCKTAIL | | | |
| 19:15 | Registration | | | | |
| 19:30 | | | | | |
| 19:45 | | | | | |
| 20:00 | | | | | |
| 20:15 | | | | | |
| 20:30 | | | | | |
| 20:45 | | MURCIA TOUR | GALA DINNER | | |
| 21:00 | | | | | |
| 21:15 | | | | | |
| 21:30 | | | | | |
| 21:45 | | | | | |
| 22:00 | | | | | |

6. COMPLETE CONFERENCE PROGRAM

Wednesday 8:45 – 19:00 (Check individual programmes for detailed schedule)

Tutorials and Doctoral Consortium

Location: Salón de Grados (at cloisters)

- 08:45 **Tutorial #2 Bayesian Networks in Computational Neuroscience**
Pedro Larrañaga and Concha Bielza
- 9:55 **Tutorial #1 An Introduction to Agent-Based Modeling**
John Holmes
- 11:55 **Tutorial #3 Evaluating Prognostic Models in Medicine**
Ameen Abu-Hanna and Niels Peek
- 14:45 **Doctoral Consortium**
Nada Lavrac

Thursday 09:00 – 20:15

OPENING AND AWARDS CEREMONY

Location: Paraninfo (Main Hall)

Niels Peek and Roque Marín

INVITED TALK

Location: Paraninfo (Main Hall)

Chair: Niels Peek

Computer-based Decision Support in the Emergency Department

Dominik Aronsky

Session 1: Decision support, guidelines and protocols

Location: Paraninfo (Main Hall)

Chair: Yuval Shahar

- 10:30 **From Decision to Shared-Decision: Introducing Patients' Preferences in Clinical Decision Analysis - A Case Study in Thromboembolic Risk Prevention**
Lucia Sacchi, Carla Rognoni, Stefania Rubrichi, Silvia Panzarasa, and Silvana Quaglini

- 10:55 **Model-Based Combination of Treatments for the Management of Chronic Comorbid Patients**
David Riaño and Antoni Collado
- 11:00 **Using Constraint Logic Programming to Implement Iterative Actions and Numerical Measures During Mitigation of Concurrently Applied Clinical Practice Guidelines**
Martin Michalowski, Szymon Wilk, Wojtek Michalowski, Di Lin, Ken Farion, and Subhra Mohapatra
- 11:05 **A Multi-agent Planning Approach for the Generation of Personalized Treatment Plans of Comorbid Patients**
Inmaculada Sánchez-Garzón, Juan Fdez-Olivares, Eva Onaindía, Gonzalo Milla, Jaime Jordán, and Pablo Castejón
- 11:10 **Merging Disease-Specific Clinical Guidelines to Handle Comorbidities in a Clinical Decision Support Setting**
Borná Jafarpour and Syed Sibte Raza Abidi
- 11:15 **Multiparty Argumentation Game for Consensual Expansion Applied to Evidence Based Medicine**
Stefano Bromuri and Maxime Morge

Session 2: Semantic technology I

Location: Paraninfo (Main Hall)

Chair: Silvana Quaglini

- 11:45 **Rule-based Formalization of Eligibility Criteria for Clinical Trials**
Zhisheng Huang, Annette ten Teije, and Frank van Harmelen
- 12:10 **Characterizing Health-Related Information Needs of Domain Experts**
Eya Znaidi, Lynda Tamine, Cecile Chouquet, and Chiraz Latiri
- 12:35 **Comparison of Clustering Approaches through their Application to Pharmacovigilance Terms**
Marie Dupuch, Christopher Engström, Sergei Silvestrov, Thierry Hamon, and Natalia Grabar
- 13:00 **Trusting Intensive Care Unit (ICU) Medical Data: A Semantic Web Approach**
Laura Moss, David Corsar, Ian Piper, and John Kinsella
- 13:05 **Learning Formal Definitions for SNOMED CT from Text**
Yue Ma and Felix Distel
- 13:10 **Towards Automatic Patient Eligibility Assessment: From Free-Text Criteria to Queries**
Krystyna Milian and Annette ten Teije

Session 3: Bioinformatics

Location: Paraninfo (Main Hall)

Chair: John Holmes

- 14:45 **Biomedical Knowledge Extraction using Fuzzy Differential Profiles and Semantic Ranking**
Sidahmed Benabderrahmane
- 15:10 **Knowledge-Based Identification of Multicomponent Therapies**
Francesca Vitali, Francesca Mulas, Pietro Marini, and Riccardo Bellazzi
- 15:15 **Enhancing Random Forests Performance in Microarray Data Classification**
Nicoletta Dessì, Gabriele Milia, and Barbara Pes
- 15:20 **Copy-Number Alterations for Tumor Progression Inference**
Claudia Cava, Italo Zoppis, Manuela Gariboldi, Isabella Castiglioni, Giancarlo Mauri, and Marco Antoniotti
- 15:25 **Constraining Protein Docking with Coevolution Data for Medical Research**
Ludwig Krippahl, Fábio Madeira, and Pedro Barahona

Session 4: Machine learning

Location: Paraninfo (Main Hall)

Chair: Nada Lavrac

- 15:30 **Single and Multi-Label Prediction of Family Burden with Schizophrenic Patients**
Pablo Bermejo, Marta Lucas, José A. Rodríguez-Montes, Pedro J. Tárraga, Javier Lucas, José A. Gómez, and José M. Puerta
- 15:55 **Predicting Adverse Drug Events by Analyzing Electronic Patient Records**
Isak Karlsson, Jing Zhao, Lars Asker, and Henrik Boström
- 16:05 **Top-level MeSH Disease Categories Are Not Linearly Separable in Clinical Trial Abstracts**
Joël Kuiper and Gert van Valkenhoef

Session 5: Probabilistic modelling and reasoning

Location: Paraninfo (Main Hall)

Chair: Steen Andreassen

- 16:45 **Understanding the Co-occurrence of Diseases using Structure Learning**
Martijn Lappenschaar, Arjen Hommersom, Joep Lagro, and Peter J.F. Lucas
- 17:10 **Online Diagnostic System Based on Bayesian Networks**
Adam Zagorecki, Piotr Orzechowski, and Katarzyna Holownia
- 17:15 **A Probabilistic Graphical Model for Tuning Cochlear Implants**
Iñigo Bermejo, Francisco Javier Díez, Paul Govaerts, and Bart Vaerenberg

Friday 09:30 – 19:00

INVITED TALK

Location: Paraninfo (Main Hall)

Chair: Mor Peleg

Towards Intelligent Telemedicine Services

Hermie Hermens.

Session 6: Image and signal processing

Location: Paraninfo (Main Hall)

Chair: Riccardo Belazzi

- 10:30 **Semi-supervised Projected Clustering for Classifying GABAergic Interneurons**
Luis Guerra, Ruth Benavides-Piccione, Concha Bielza, Víctor Robles, Javier De Felipe, and Pedro Larrañaga
- 10:55 **Cascaded Rank-Based Classifiers for Detecting Clusters of Microcalcifications**
Alessandro Bria, Claudio Marrocco, Mario Molinara, and Francesco Tortorella
- 11:00 **Segmenting Neuroblastoma Tumor Images and Splitting Overlapping Cells Using Shortest Paths between Cell Contour Convex Regions**
Siamak Tafavogh, Karla Felix Navarro, Daniel R. Catchpoole, and Paul J. Kennedy
- 11:05 **Classification of Early-Mild Subjects with Parkinson's Disease by Using Sensor-Based Measures of Posture, Gait, and Transitions**
Luca Palmerini, Sabato Mellone, Guido Avanzolini, Franco Valzania, and Lorenzo Chiari
- 11:10 **False Positive Reduction in Detector Implantation**
Noelia Vázquez, Gloria Bueno, and Oscar Déniz

Session 7: Semantic technology II

Location: Paraninfo (Main Hall)

Chair: Annette ten Teije

- 11:45 **Redundant Elements in SNOMED CT Concept Definitions**
Kathrin Dentler and Ronald Cornet
- 12:10 **Medical Ontology Validation through Question Answering**
Asma Ben Abacha, Marcos Da Silveira, and Cédric Pruski
- 12:35 **Lexical Characterization and Analysis of the BioPortal Ontologies**
Manuel Quesada-Martínez, Jesualdo Tomas Fernandez-Breis, and Robert Stevens

- 13:00 **Ontology-Based Reengineering of the SNOMED CT Context Model**
Catalina Martínez-Costa and Stefan Schulz
- 13:05 **Using a Cross-Language Approach to Acquire New Mappings between Two Biomedical Terminologies**
Fleur Mougín and Natalia Grabar

Session 8: Temporal data visualization and analysis

Location: **Paraninfo (Main Hall)**

Chair: *Ameen Abu-Hanna*

- 14:45 **Clinical Time Series Prediction with a Hierarchical Dynamical System**
Zitao Liu and Milos Hauskrecht
- 15:10 **Extraction, Analysis, and Visualization of Temporal Association Rules from Interval-Based Clinical Data**
Carlo Combi and Alberto Sabaini
- 15:35 **Learning to Identify Inappropriate Antimicrobial Prescriptions**
Mathieu Beaudoin, Froduald Kabanza, Vincent Nault, and Louis Valiquette
- 16:00 **An approach for mining care trajectories for chronic diseases**
Elias Egho, Nicolas Jay, Chedy Raïssi, Gilles Nuemi, Catherine Quantin, and Amedeo Napoli
- 16:25 **Similarity Measuring between Patient Traces for Clinical Pathway Analysis**
Zhengxing Huang, Xudong Lu, and Huilong Duan

Session 9: Natural language processing

Location: **Paraninfo (Main Hall)**

Chair: *Carlo Combi*

- 17:00 **Instantiating Interactive Narratives from Patient Education Documents**
Fred Charles, Marc Cavazza, Cameron Smith, Gersende Georg, and Julie Porteous
- 17:25 **Added-Value of Automatic Multilingual Text Analysis for Epidemic Surveillance**
Gaël Lejeune, Romain Brixtel, Charlotte Lecluze, Antoine Doucet, and Nadine Lucas
- 17:50 **An Approach for Query-Focused Text Summarisation for Evidence Based Medicine**
Abeed Sarker, Diego Mollá, and Cécile Paris
- 18:15 **Clustering of Medical Publications for Evidence Based Medicine Summarisation**
Sara Faisal Shash and Diego Mollá
- 18:20 **Classifying Measurements in Dictated, Free-Text Radiology Reports**
Merlijn Sevenster

CLOSING CEREMONY

Location: Paraninfo (Main Hall)

Niels Peek and Roque Marin

Saturday 09:30 – 19:00 (check individual programmes for detailed schedule)

WORKSHOP #1: Knowledge Representation for Health Care and Process-oriented Information Systems in Healthcare (KR4HC'13 / ProHealth'13)

Location: Salón de Grados (cloisters)

WORKSHOP #2: Agents Applied in Health Care

Location: Sala de Juntas (cloisters)

7. INVITED TALKS

Thursday

Computer-based Decision Support in the Emergency Department

Dominik Aronsky

The Emergency Department is a fast-paced, information intensive environment that can benefit from improved information management. The presentation will discuss how an integrated information system infrastructure can support providers to deliver high-quality patient care, optimize operational activities, and facilitate clinical and informatics research studies in an emergency care setting. Illustrative examples will include improvement of pneumonia care processes, implementation of asthma guidelines, and forecasting Emergency Department overcrowding.

Friday

Towards intelligent Telemedicine services

Hermie Hermens

Telemedicine is an area of innovation in the delivery of health care services, which is expected to have a great impact by making health care more efficient and cost effective, and by supporting independent living and self-management. Especially these last two are crucial as the number of people with chronic conditions who need long term care increases while our limited health service resources become more and more stretched.

8. POSTER SESSION

Location: Cloisters

Time: Thursday 18:30-20:30

POSTERS: Decision support, guidelines and protocols

Model-Based Combination of Treatments for the Management of Comorbid Chronic Patients

David Riaño and Antoni Collado

Using Constraint Logic Programming to Implement Iterative Actions and Numerical Measures During Mitigation of Concurrently Applied Clinical Practice Guidelines

Martin Michalowski, Szymon Wilk, Wojtek Michalowski, Di Lin, Ken Farion, and Subhra Mohapatra

A multi-agent planning approach for the generation of personalized treatment plans of comorbid patients

Inmaculada Sánchez-Garzón, Juan Fdez-Olivares, Eva Onaindía, Gonzalo Milla, Jaume Jordán, and Pablo Castejón

Merging Disease-Specific Clinical Guidelines to Handle Comorbidities in a Clinical Decision Support Setting

Borna Jafarpour and Syed Sibte Raza Abidi

Multiparty Argumentation Game for Consensual Expansion Applied to Evidence Based Medicine

Stefano Bromuri and Maxime Morge

POSTERS: Semantic technology

Trusting Intensive Care Unit (ICU) Medical Data: A Semantic Web Approach

Laura Moss, David Corsar, Ian Piper, and John Kinsella

Learning Formal Definitions for SNOMED CT from Text

Yue Ma and Felix Distel

Towards automatic patient recruitment: From Free-text eligibility criteria to queries

Krystyna Milian and Annette ten Teije

Ontology-based reengineering of the SNOMED CT context hierarchy

Catalina Martínez-Costa and Stefan Schulz

Using a cross-language approach to improve the mapping between biomedical terminologies

Fleur Mougín and Natalia Grabar

POSTERS: Bioinformatics

Knowledge based identification of multicomponent therapies

Francesca Vitali, Francesca Mulas, Pietro Marini, and Riccardo Bellazzi

Enhancing Random Forests Performance in Microarray Data Classification

Nicoletta Dessì, Gabriele Milia, and Barbara Pes

Copy–Number Alterations for tumor progression inference

Claudia Cava, Italo Zoppis, Manuela Gariboldi, Isabella Castiglioni, Giancarlo Mauri, and Marco Antoniotti

Constraining protein docking with coevolution data for medical research

Ludwig Krippahl, Fábio Madeira, and Pedro Barahona

POSTERS: Machine learning

Predicting Adverse Drug Events by Analyzing Electronic Patient Records

Isak Karlsson, Jing Zhao, Lars Asker, and Henrik Boström

Top-level MeSH Disease Categories Are Not Linearly Separable in Clinical Trial Abstracts

Joël Kuiper and Gert van Valkenhoef

POSTERS: Probabilistic modelling and reasoning

Online Diagnostic System based on Bayesian Networks

Adam Zagorecki, Piotr Orzechowski, and Katarzyna Holownia

A Probabilistic Graphical Model for Tuning Cochlear Implants

Íñigo Bermejo, Francisco Javier Díez, Paul Govaerts, and Bart Vaerenberg

POSTERS: Image and signal processing

Cascaded Rank-based Classifiers for Detecting Clusters of Microcalcifications

Alessandro Bria, Claudio Marrocco, Mario Molinara, and Francesco Tortorella

Segmenting Cellular Regions of Neuroblastoma Tumor and Splitting Overlapping Cells using Shortest Paths between Convex Regions of Cell Contours

Siamak Tafavogh, Karla Felix Navarro, Daniel R. Catchpoole, and Paul J. Kennedy

Classification of early PD subjects by using sensor-based measures of posture, gait, and transitions

Luca Palmerini, Sabato Mellone, Guido Avanzolini, Franco Valzania, and Lorenzo Chiari

Gradual False Positive Reduction at Detector Implantation

Noelia Vázquez, Gloria Bueno, and Oscar Déniz

POSTERS: Temporal data visualization and analysis

Similarity measuring between patient traces for clinical pathway analysis

Zhengxing Huang, Xudong Lu, and Huilong Duan

POSTERS: Natural language processing

Clustering of Medical Publications for Evidence Based Medicine Summarisation

Sara Faisal Shash and Diego Mollá

Recognizing and classifying measurements in dictated, free-text radiology reports

Merlijn Sevenster

9. TUTORIALS

Wednesday

Tutorial #1: An Introduction to Agent-Based Modeling

John H. Holmes (jhholmes@mail.med.upenn.edu)

Center for Clinical Epidemiology and Biostatistics, Perelman School of Medicine University of Pennsylvania, Philadelphia, PA, USA.

Agent-based models offer an approach to simulation that is at once mathematical and social, and as such they offer a unique way to view and model the behavior of intelligent agents over a range of investigator-created environmental and agent conditions. This tutorial will introduce attendees to the concepts of agent-based modeling, including identifying suitable problems for modeling with agents, creating simulated environments, imbuing agents with intelligence, parameterization, running temporal models, evaluating agent behavior, and applying agent-based models to a variety of biomedical domains, such as infectious disease, violence, immunology, and social networks. Throughout the tutorial, attendees will gain practical experience in learning the concepts through developing and implementing an agent-based model using NetLogo, a well-known and intuitive modeling package that is freely available online <http://ccl.northwestern.edu/netlogo/>. Level: 50% basic, 50% intermediate. Attendees are not expected to have any prior experience in NetLogo or in agent-based modeling.

Tutorial #2 : Bayesian Networks in Computational Neuroscience

Pedro Larrañaga (pedro.larranaga@fi.upm.es) and Concha Bielza

**Computational Intelligence Group, Department of Artificial Intelligence
School of Computer Science, Universidad Politécnica de Madrid, Madrid, Spain.**

Neuroscience faces challenging problems that require new machine learning methods. In this tutorial we will present some real-world examples where Bayesian network models fit after some adaptation. These problems include: (a) neuroanatomy issues, like modeling and simulation of dendritic trees, inferring electrophysiological behavior from morphological neuron characteristics, and classifying neuron and spine types based on morphological features; (b) neurodegenerative diseases, like predicting health-related quality of life in Parkinson's disease, classification of dementia stages in Parkinson's disease and searching for genetic biomarkers in Alzheimer's disease.

Tutorial #3 : Evaluating Prognostic models in Medicine

Ameen Abu-Hanna (a.abu-hanna@amc.uva.nl) and Niels Peek

**Department of Medical Informatics, Academic Medical Center
University of Amsterdam, Amsterdam, The Netherlands.**

The reliable prediction of outcomes from disease and disease treatment is becoming increasingly important in the delivery and organization of health care, and has a wide range of applications in clinical care, biomedical research, and healthcare management. The standard methodology for obtaining objective outcome predictions is to build a prognostic model from a set of observed patient data and clinical outcomes, and to apply that model to data from new patients. This tutorial focuses on methodologies for quantitative assessment of the performance of prognostic models. The key to

quantitative evaluation is the use of reliable methods for obtaining valid performance measures with well-defined characteristics. The tutorial will clarify the relevant methods and the relationship between them using conceptual and mathematical frameworks. All methods are illustrated with real-world examples from the domains of cardiac surgery and intensive care medicine. We will also specifically address a framework for how to develop, evaluate, and report on prognostic modelling. This framework will be illustrated by various published studies.

10. WORKSHOPS

Saturday

Workshop #1 : Knowledge Representation for Health Care and Process-oriented Information Systems in Healthcare (KR4HC'13 / ProHealth'13)

Healthcare organizations are facing the challenge of delivering high quality services at affordable costs. These challenges become more prominent with the growth in the aging population with chronic diseases and the rise of healthcare costs. High degree of specialization of medical disciplines, huge amounts of medical knowledge and patient data, and the need for personalized healthcare are prevalent trends in this information-intensive domain. The emerging situation necessitates computer-based support of healthcare process & knowledge management as well as clinical decision-making.

To address these challenges, this workshop brings together researchers from two communities. The knowledge-representation for healthcare community has been focusing on knowledge representation and reasoning to support knowledge management and clinical decision-making. This community has been developing efficient representations, technologies, and tools for integrating all the important elements that health care providers work with: Electronic Medical Records (EMRs) and healthcare information systems, clinical practice guidelines, and standardized medical vocabularies. The process-oriented information systems in healthcare community have been studying ways to adopt business process technology in order to provide effective solutions for healthcare process management. Their challenges include supporting high degree of flexibility, integration with EMRs, and the need for tight cooperation and communication among medical care teams.

This joint workshop shall elaborate both the potential and the limitations of the two approaches for supporting healthcare process & healthcare knowledge management as well as clinical decision-making. It shall further provide a forum wherein challenges, paradigms, and tools for optimized knowledge-based clinical process support can be debated.

Workshop #1 Schedule Session 1: Semantic Interoperability in Health Care

Location: Salón de Grados (cloisters)

Duration: 9:30-11:15

Welcome by Workshop Organizers

How Ontologies can Improve Semantic Interoperability in Health Care (Keynote)

Stefan Schulz

SemanticCT: A Semantically-Enabled System for Clinical Trials

Zhisheng Huang, Annette ten Teije and Frank van Harmelen.

Session 2: Modeling Clinical Guidelines

Location: Salón de Grados (cloisters)

Duration: 11:45-13:00

Identifying Condition-Action Sentences Using a Heuristic-based Information Extraction Method

Reinhardt Wenzina and Katharina Kaiser

Supporting Computer-Interpretable Guidelines' - Modeling by Automatically Classifying Clinical Actions

Anne-Lyse Minard and Katharina Kaiser

Discovering Probabilistic Structures of Care

Arjen Hommersom, Sicco Verwer and Peter Lucas

Session 3: Knowledge-based Techniques for Handling Clinical Data

Location: Salón de Grados (cloisters)

Duration: 14:45-16:30

Implementation of a System for Intelligent Summarization of Longitudinal Clinical Records

Ayelet Goldstein and Yuval Shahar

Knowledge-based Patient Data Generation

Zhisheng Huang, Frank Van Harmelen, Annette Ten Teije and Kathrin Dentler

An Ontology-Driven Personalization Framework for Designing Theory-Driven Self-Management Interventions

Syed Sibte Raza Abidi and Samina Abidi

Coping with Temporal Indeterminacy in Medical Data (Short presentation)

Luca Anselma and Paolo Terenziani

Session 4: Context-aware Services and Guidance

Location: Salón de Grados (cloisters)

Duration: 17:00-18:30

Dynamic Homecare Service Provisioning: A Field Test and its Results

Alireza Zarghami, Mohammad Zarifi Eslami, Marten van Sinderen and Roel Wieringa

iALARM: an Intelligent Alert Language for Activation, Response, and Monitoring of Medical Alerts

Denis Klimov and Yuval Shahar

GLM-CDS: A Standards-based Verifiable Guideline Model for Decision Support in Clinical Applications

Marco Iannaccone, Massimo Esposito and Giuseppe De Pietro

Architecture for a Ubiquitous Context-aware Clinical Guidance System for Patients and Care Providers (Short presentation)

Mor Peleg, Tom Broens, Arturo González-Ferrer and Erez Shalom.

Workshop #2 : Agents Applied in Health Care

Intelligent agent-based systems constitute one of the most exciting research areas in Artificial Intelligence. Due to the growing interest in the application of agent-based systems, a number of applications addressing clinical problems are already based in agent technology. The 8th workshop on Agents Applied in Health Care provides a forum to the specialists in the field to meet and report on the results achieved in this area, to discuss the benefits (and drawbacks) that agent-based systems may bring to the medical domain, and also to provide a list of the research topics that should be tackled in the near future. The organising committee will pay special attention to papers describing applications which are not just academic, but that are already deployed and running in a real medical environment.

Current topics of research in this area include, among others, agent-based medical decision support systems, personalized health systems for remote and autonomous tele-assistance, communication and co-operation between distributed intelligent agents to manage patient care, information agents that retrieve medical information from distributed repositories, intelligent and distributed health care data mining, agent-based medical tutoring systems and multi-agent systems that assist medical professionals in the tasks of monitoring and diagnosis.

Workshop #2 Schedule Workshop presentation

Location: Sala de Juntas (cloisters)

Duration: 9:30-9:45

A.Moreno, U.Cortés, D.Isern, H.Lindgren, M.Lluch-Ariet, M.Schumacher

Session 1: Presentation of posters

Location: Sala de Juntas (cloisters)

Duration: 9:45-11:15

SPiDer: Integrating smart medical dispensing with multi-purposed assistance systems for elderly

J.Moreno, D.García-Gasulla, U.Cortés

Hypothesis-driven agent dialogues for dementia assessment

C.Yan, H.Lindgren

A closeop-loop simulator of long term care systems for elderly people

F.Grimaldo, J.M.Orduña, F.Ródenas, J.Garcés

Session 2: Discussion on E-Health funding opportunities

Location: Sala de Juntas (cloisters)

Duration: 11:45-13:00

Dr. Ulises Cortés (Technical University of Catalonia)

Dr. Ulises Cortés has a long experience on the definition and management of European e-health research projects. In this session he will describe the expected main lines of research on e-Health on the 2020 Horizon, he will comment the main funding instruments at the European level that will be available in the next years, and he will lead a discussion among the workshop participants on the possibilities of defining joint e-Health projects in which agent technology may play a key role.

Session 3: Agents in health care, multi-disciplinary decision making

Location: Sala de Juntas (cloisters)

Duration: 14:45-16:30

Profiling roles and scenarios of agent application in healthcare: a systematic review

P.M. Vieira-Marques, R.Cruz-Correia, S.Robles

Developing an open and adaptive agent architecture to support multidisciplinary decision making

L.Xiao, J.Fox, H.Zhu

A multiagent system to support an interdisciplinary healthcare team: a case study of clinical obesity management in children

D.Astaraky, S.Wilk, W.Michalowski, P.Andreev, C.Kuziemy, S.Hadjiyannakis

Session 4: Agent-based ambient assistance

Location: Sala de Juntas (cloisters)

Duration: 17:00-18:45

ALI, an ambient assisted living system for supporting behaviour change

E.Guerrero, H.Lindgren, J.C.Nieves

Towards personalised support for monitoring and improving health in risky environments

J.Baskar, H.Lindgren

Situated agents and humans in social interaction for elderly healthcare: the case of COAALAS

I.Gómez-Sebastià, S.Álvarez-Napagao, D.García-Gasulla, U.Cortés

11. DOCTORAL CONSORTIUM

Wednesday

The fifth Doctoral Consortium for the Artificial Intelligence in Medicine (AIME) series of conferences will take place on Wednesday 29th May 2013 in conjunction with the 14th Conference on Artificial Intelligence in Medicine (AIME 2013) to be held in Murcia, Spain (<http://www.aimedicine.info/aim13/>). The Doctoral Consortium will provide an opportunity for PhD students to present their research plans or their preliminary work in an informal and supportive atmosphere. The PhD students will be able to discuss their plans, preliminary results (optional), and the specific problems they are encountering. They will get feedback and advice from a number of prominent academic researchers with substantial experience in the field who will actively give constructive feedback and advice and contribute to the discussions.

The Doctoral Consortium will host the presentations by 7 PhD students who will be selected by the Doctoral Consortium chair. It will also include a short intensive tutorial on structuring a research paper (and the corresponding work) on different topics and with different perspectives (theoretical, methodological, experimental, application-oriented), and will be concluded with a general discussion and evaluation.

Doctoral Consortium Schedule

Location: Sal3n de Grados (cloisters)

Chair: Nada Lavrac

14:45 Opening Session

Nada Lavrac

15:00 Temporal Data Warehousing, OLAP, and Mining in Pharmacology

Alberto Sabaini (Yuval Shahar, Ameen Abu-Hanna)

15:30 A computerized system for the rehabilitation of cognitively impaired subjects

Anna Alloni (Niels Peek, Roque Mar3n Morales)

16:00 Evolving clustering for stochastic processes: an application in electrocardiography

David G. Marquez (Riccardo Belazzi, Carlo Combi)

16:30 Coffee Break

17:00 Computerized protocols for the supervision of mechanically ventilated patients in critical care

Kaouter Saihi (Silvana Quaglini, Steen Andreassen)

17:30 Spatial Analysis of Dendritic Spines Distribution with Bayesian Networks

Laura Anton-Sanchez (Peter Lucas, Michel Dojat)

18:00 The SMART-Amy Project: a Smart Guide towards the Diagnosis of Systemic Amyloidosis

Paola Russo (Niels Peek, Roque Mar3n Morales)

- 18:30 **Improving fall prevention by providing tailored communication to elderly patients**
Marjan Askari (Carlo Combi, Nada Lavrac)
- 19:00 **Ending session**
Nada Lavrac

12. CONFERENCE ORGANIZATION

| | |
|--------------------------------------|--|
| Scientific Chair | Niels Peek Academic Medical Center, The Netherlands |
| Local Chair | Roque Marín University of Murcia, Spain |
| Doctoral Consortium Chair | Nada Lavrac Jozef Stefan Institute, Slovenia |

13. PROGRAM COMMITTEE

Raza Abidi, Canada
Ameen Abu-Hanna, The Netherlands
Klaus-Peter Adlassnig, Austria
Steen Andreassen, Denmark
Pedro Barahona, Portugal
Riccardo Bellazzi, Italy
Isabelle Bichindaritz, USA
Carlo Combi, Italy
Amar Das, USA
Michel Dojat, France
Henrik Eriksson, Sweden
Paulo Felix, Spain
Catherine Garbay, France
Adela Grando, UK
Femida Gwadry-Sridhar, Canada
Frank van Harmelen, The Netherlands
Milos Hauskrecht, USA
Reinhold Haux, Germany
John Holmes, USA
Arjen Hommersom, The Netherlands
Werner Horn, Austria
Val Jones, The Netherlands
Katharina Kaiser, Austria
Elpida Keravnou, Cyprus
Pedro Larranaga, Spain
Nada Lavrac, Slovenia
Xiaohui Liu, UK
Peter Lucas, The Netherlands
Mar Marcos, Spain
Roque Marin Morales, Spain

Michael Marscholleck, Germany
Carolyn McGregor, Canada
Paola Mello, Italy
Silvia Miksch, Austria
Stefania Montani, Italy
Barbara Oliboni, Italy
Niels Peek, The Netherlands
Mor Peleg, Israel
Christian Popow, Austria
Silvana Quaglini, Italy
Alan Rector, UK
Stephen Rees, Denmark
David Riano, Spain
Lucia Sacchi, Italy
Abdul Sattar, Australia
Rainer Schmidt, Germany
Brigitte Seroussi, France
Yuval Shahar, Israel
Costas Spyropoulos, Greece
Annette ten Teije, The Netherlands
Paolo Terenziani, Italy
Samson Tu, USA
Allan Tucker, UK
Alfredo Vellido, Spain
Dongwen Wang, USA
Blaz Zupan, Slovenia
Pierre Zweigenbaum, France

14. ATTEENDEES

Syed Abidi
Samina Abidi
Ameen Abu - Hanna
Anna Alloni
Steen Andreassen
Laura Anton-Sanchez
Dominik Aronsky
Marjan Askari
Pedro Barahona
Jayalakshmi Baskar
Mathieu Beaudoin
Riccardo Bellazzi
Francesco Bellocchio
Sidahmed Benabderrahmane
Iñigo Bermejo
Concha Bielza
Oivind Braaten
Stefano Bromuri
Manuel Campos
Veruska Carretta Zamborlini
Claudia Cava
Marc Cavazza
Carlo Combi
Oscar Deniz-Suarez
Kathrin Dentler
Michel Dojat
Lennart Edblom
Elias Egho
Sabine Ensing
Jesualdo Tomás Fernández Breis
Juan Fernández Olivares
Nick Fung
Jose Antonio Gámez Martín
Gersende Georg
Antonio Gomariz
Arturo González Ferrer
David González Márquez
Natalia Grabar
Francisco Grimaldo Moreno
Luis Guerra

Esteban Guerrero
Femida Gwadry-Sridhar
Milos Hauskrecht
Henrik Hellqvist
Hermie Hermens
Jonh Holmes
Arjen Hommersom
Zhengxing Huang
Zhisheng Huang
Marco Iannaccone
Jose M. Juarez
Isak Karlsson
Joel Kuiper
Martijn Lappenschaar
Pedro Iarrañaga
Nada Lavrac
María del Carmen Legaz García
Richard Lenz
Helena Lindgren
Peter Lucas
Eduardo Lupianu
Yue Ma
Aisan Maghsoodi
Mar Marcos
Roque Marín
Pedro Marques
Catalina Martínez Costa
Stefan Mersmann
Martin Michalowski
Wojtek Michalowski
Gabriele Milia
Krystyna Milian
Gonzalo Milla Millán
Anne-Lyse Minard
Diego Molla Aliod
Antonio Moreno
Laura Moss
Fleur Mougín
Luca Palmerini
Niels Peek

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|---------------------------|------------------|
| Mor | Peleg |
| Cedric | Pruski |
| Silvana | Quaglini |
| Manuel | Quesada Martínez |
| David | Riaño |
| Jose A. | Rubio |
| Paola | Russo |
| Alberto | Sabaini |
| Lucia | Sacchi |
| Kaouther Saihi | |
| Inmaculada Sánchez Garzón | |
| Abeed | Sarker |
| Stefan | Schulz |
| Merlijn | Sevenster |
| Erez | Shalom |
| Jose Antonio T. Palma | |
| Siamak Tafavogh | |
| Annette Ten Teije | |
| Paolo Terenziani | |
| Francesco Tortorella | |
| Francesca Vitali | |
| Reinhardt Wenzina | |
| Szymon Wilk | |
| Kama Wlodzimirow | |
| Liang Xiao | |
| Chunli Yan | |
| Adam Zagorecki | |
| Alireza Zarghami | |
| Jing Zhao | |
| Eya Znaidi | |

15. My Notes

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