# DALT School 2011 First International School on Declarative Agent Languages and Technologies Bertinoro, Italy, April 10-15, 2011 (co-located with ISCL 2011) http://lia.deis.unibo.it/confs/dalt\_school \* EARLY REGISTRATION DEADLINE: MARCH 10, 2011 \*

**DALT** is a well-established forum for researchers interested in sharing their experiences in combining declarative and formal approaches with engineering and technology aspects of agents and multiagent systems. Building complex agent systems calls for models and technologies that ensure **predictability**, allow for the verification of properties, and guarantee flexibility. Developing technologies that can satisfy these requirements still poses an important and difficult challenge. Here, declarative approaches have the potential of offering solutions satisfying the needs for both specifying and developing multiagent systems. Moreover, they are gaining more and more attention in important application areas such as the semantic web, serviceoriented computing, security, and electronic contracting. The DALT School builds on the success of 8 editions of the international AAMAS workshop series. The DALT School aims at giving a **comprehensive introduction** to this exciting research domain and disseminate the results of research achieved in this 9-year-long activity with a perspective on the future.

The school will include sessions dedicated to PhD students, mentoring activities, focussed discussions and guided brainstorming.

## **TOPICS & LECTURERS**

- Agent Reasoning: Knowledge, Plans and Flexible Control Cycles.
  - Lecturer: Francesca Toni.

Francesca is Reader in Computational Logic in the Department of Computing at Imperial College London and Leader of the Computational Logic and Argumentation research group. She has been Principal Investigator of several EU-funded projects in the areas of logic-based agents and argumentation. She is one of the main researchers who developed the KGP model of agency.

• Agent Reasoning: Goals and Preferences.

Lecturer: Birna van Riemsdijk.

Birna is Assistant Professor at TU Delft, where she develops techniques for engineering intelligent software systems that can support humans in performing complex tasks. Her research focusses on the use and development of declarative agent programming languages. She is one of the developers of the GOAL language and a member of the DALT steering committee.

• Agent Interaction: Languages, Dialogues and Protocols. Lecturer: **Peter McBurney**.

Peter is Professor of Computer Science and Head of the ART group at the University of Liverpool. He has been leading EU-funded research initiatives and managed many research grants for agent-related research wordwide and acted as a management consultant for leading IT and Telecommunications companies. His research focusses on semantics and pragmatics of agent communication and on multi-agent models of economic markets and marketing.

• Organisation, Coordination and Norms for Multi-Agent Systems.

#### Lecturer: Wamberto Vasconcelos.

Wamberto is a senior lecturer at the University of Aberdeen, where he works on intelligent software agents and on knowledge technologies. He has been involved in several international research projects on information technologies and service sciences. He is a member of the steering committee of the Coordination, Organization, Institutions and Norms workshop series (COIN) and an organizer of the DALT workshop in 2010 and 2011. • Agent and Multi-Agent Software Engineering: Modelling, Programming, and Verification. Lecturer: Rafael Bordini.

Rafael is Associate Professor at Universidade Federal do Rio Grande do Sul. He is one of the main developers of the Jason framework and author of several books on agent programming. His research interests cover various aspects of software engineering for autonomous systems, including programming, modelling, verification, testing, debugging and application deployment.

**TARGET AUDIENCE** The school targets graduate students as well as other interested researchers, from university, government and industry. It will allow students to get a thorough overview of cutting-edge research and technologies and get in touch with leading scientists.

The school aims to be truly international with a strong participation from regions all around the world. This will help students make connections with international participants and set the base for potentially long-term cooperations.

An initial list of participants is available on the school Web site.

**FINANCIAL AID AND MORE** Grant application is now closed. However, advditional support is still available to AEPIA, APPIA, ACIA, AIXIA and AISB members.

Limited personal subscription to selected journals will be offered by John Wiley & Sons to all attendees registered before March 25, 2011.

**VENUE** The University Residential Center is located in the small medieval hilltop town of Bertinoro, 50km east of Bologna at an elevation of 230m above sea level. Bertinoro is easily reachable from Bologna and Forli airport or train station. The registration includes shuttle bus on April 10 and April 15. Bertinoro is close to many splendid Italian locations such as Ravenna, Rimini on the Adriatic coast, and the Republic of San Marino (all within 35km). Bertinoro can also be a base for visiting some of the better-known Italian locations such as Padua, Ferrara, Venice, Urbino, Florence and Siena.

**SPONSORS** AI Journal, COST Action IC0801 "Agreement Technologies", Foundation for Intelligent Physical Agents, Spanish Association for AI, Catalan Association for AI, Portuguese Association for AI, The British Society for the Study of AI and Simulation of Behaviour, Italian Association for AI, Italian Association for Logic Programming, SICStus Prolog, John Wiley & Sons, Bertinoro International Center for Informatics.

**INQUIRIES** Send your inquires to dalt.school.2011@ gmail.com. We will answer in 2 working days.

## ORGANISATION

School Organisers

Paolo Torroni, DEIS, University of Bologna Andrea Omicini, DEIS, University of Bologna

Student Session Organiser

**Federico Chesani**, DEIS, University of Bologna Local Organisers

Marco Prandini, DEIS, University of Bologna Eleonora Campori, Bertinoro Center for Informatics Manuela Schiavi, Bertinoro Center for Informatics

# LECTURES

## Agent and Multi-Agent Software Engineering: Modelling, Programming & Verification

## Agent Reasoning: Knowledge, Plans & Flexible Control Cycles



I will present the KGP (Knowledge, Goals and Plan) model of agency. This model allows the specification of heterogeneous agents that can interact with each other, and can exhibit both proactive and reactive behaviour allowing them to function in dynamic environments by adjusting their goals and plans when changes happen in such environments. The KGP model

provides a highly modular agent architecture that integrates a collection of reasoning and physical capabilities, synthesised within transitions that update the agentÕs state in response to reasoning, sensing and acting. Transitions are orchestrated by cycle theories that specify the order in which transitions are executed while taking into account the dynamic context and agent preferences, as well as selection operators for providing inputs to transitions. Cycle theories are means to program the control of agents in a flexible and adaptable manner. I will also present an argumentative variant of the KGP model, where reasoning capabilities are supported by argumentation. (Lecturer: **Francesca Toni**).

#### Agent Reasoning: Goals & Preferences



In this course we will investigate how motivational attitudes like desires, goals and intentions have been and are being used to represent and program agent reasoning. We will consider both theoretical approaches for investigating these notions and their interplay, as well as ways of using these notions to develop cognitive agents. The GOAL agent programming language in which the notion of

goal is important will be used for illustration. Recent results from empirical studies on how GOAL is used to program agents that control bots in Unreal Tournament will be presented. (Lecturer: **Birna van Riemsdijk**).

## Agent Interaction: Languages, Dialogues & Protocols



In this course we will explore the design and engineering of artificial communications languages and protocols to enable autonomous, intelligent software agents to communicate with one another. The design of these languages and protocols draws on human linguistics, on the philosophy of language and dialog, on formal logic, and on the theory of computer programming languages.

We will look at the syntax, semantics, and pragmatics of multi-agent languages and protocols, and consider related issues such as dynamic (run-time) composition of protocols and the efficient storage and retrieval of protocols. (Lecturer: **Peter McBurney**).



This course aims at providing an overview of three important parts of the practical development of multi-agent systems: modelling, programming, and verification. In particular, we will cover approaches for multi-agent systems that are based on abstractions, techniques, and tools that have been specifically tailored for autonomous agents and multiagent systems. Besides surveying

various approaches that appeared in the Agents literature for each of the three parts of the development process, we will focus the concrete examples of the Programming part on the recently put together JaCaMo platform (Lecturer: **Rafael Bordini**).

### Organisation, Coordination & Norms for Multi-Agent Systems



This course will introduce organisation theory concepts for agents and multi-agent systems; some of these concepts are objectives, roles and their relations, power, and capabilities, to name a few. We shall then use organisation concepts to create/synthesise stereotypical agents which will "embody" aspects of the organisation: these agents will coordinate efforts in order to find

and enact a joint plan to achieve individual and organisational objectives. We explicitly represent norms, that is, permissions, prohibitions and obligations, as means to "fine-tune" the coordination/planning effort, ruling out certain courses of actions or giving preference/priority to other courses of actions. The course will make use of the tools and methodology of the EU-funded ALIVE project. (Lecturer: **Wamberto Vasconcelos**).

## ACTIVITIES



The programme will include:

- an introductory lecture to give an overview of the school
- 5 topical courses of 6 hours each
- student sessions with focussed brainstorming and organized mentoring activities
- a social trip

The school will organize student examinations, on demand. For Italian students, the participation to all courses and successful result of the examination will correspond to 2 CFU.