

Call for Application

Application deadline: January 31, 2015

USS univie: summer school

SWC Scientific World Conceptions

Since 2001 the University of Vienna and the Institute Vienna Circle have been holding an annual two-week summer program dedicated to major current issues in the natural and social sciences, their history and philosophy. The title of the program reflects the heritage of the Vienna Circle which promoted interdisciplinary and philosophical investigations based on solid disciplinary knowledge. As an international interdisciplinary program, USS-SWC brings graduate students in close contact with world-renowned scholars. It operates under the academic supervision of an International Program Committee of distinguished philosophers, historians, and scientists. The program is directed primarily to graduate students and junior researchers in fields related to the annual topic, but the organizers also encourage applications from gifted undergraduates and from people in all stages of their career who wish to broaden their horizon through crossdisciplinary studies of methodological and foundational issues in science.

The summer course consists of morning sessions, chaired by distinguished lecturers which focus on readings assigned to students in advance. Afternoon sessions are made up of smaller groups which offer senior students the opportunity to discuss their own research papers with one of the main lecturers.

The Computational Turn. Simulation in Science

Vienna, July 6-17, 2015

organized by the University of Vienna and the Institute Vienna Circle.

A two week course on the perspectives and problems of computational methods that now play a central role in many areas of science and engineering ranging from astrophysics through the social sciences to the design and production of artifacts.

Main Lecturers:

Rainer Hegselmann (University of Bayreuth)

Paul Humphreys (University of Virginia)

Margaret Morrison (University of Toronto)

International Program Committee

John Beatty (British Columbia), *Maria Carla Galavotti* (Bologna), *Malachi Hacoen* (Duke), *Michael*

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Karoly Kokai (Secretary of the USS-SWC, Vienna)

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The Computational Turn. Simulation in Science

Computational methods now play a central role in many areas of science and engineering ranging from astrophysics through the social sciences to the design and production of artifacts. Computational chemistry, computational biology, computational neuroscience, artificial life, artificial markets - the list is long and growing. Although not everything about these methods is revolutionary, they have nonetheless had a revolutionary impact of many aspects of our lives, from the way we design aircraft to trading in financial markets. Consequently they require us to rethink central topics in the philosophy and sociology of science and technology, such as the limits of human knowledge, the distribution of expertise in research teams, whether these methods are truly cross-disciplinary and if so what conclusions should we draw from that, and the relation between simulations and experiments. In a number of areas, such as complex micro-economic systems as well as high energy physics, the methods hold out the promise of greatly expanding the scope of what can be studied. Some emphasis will be given to the history of these methods and their origins in specific disciplines but special attention will be paid to the current use and future development of computational science including the role of massive data sets, the challenges of transparency, differences in modeling techniques between the natural and social sciences, and the relation between technological and scientific advances. The program is designed to appeal to scholars from a broad range of disciplines, and some sessions will be led by more than one lecturer to take advantage of their different but overlapping areas of expertise.

Specific Topics:

Computational approaches in natural and social sciences

Simulations and models: exploration, explanation and prediction

Computational models versus experimentation

Idealization and representation

Model validation and verification

Micro foundations in natural and social sciences

Social epistemology and network analysis

History of the computational turn

Challenges: replication, transparency

Data

Epistemological consequences of the computational turn

The main Lecturers

Rainer Hegselmann

Rainer Hegselmann is professor of philosophy at the University of Bayreuth. His work focuses on the development of agent based models of fundamental social dynamics as, for instance, the formation of networks of mutual support, the evolution of morality, and the dynamics of opinions. Together with Ulrich Krause he developed the so called bounded-confidence model of opinion dynamics that became very influential over the last decade and inspired a huge number of extensions and applications in different fields. Website:

<http://pe.uni-bayreuth.de/allgemein/mitarbeiter/////8bb3854c-5cf2-11df-bdba-003048d122c2//>

Paul Humphreys

Paul Humphreys is Commonwealth Professor of Philosophy at the University of Virginia and was a founding member of its cognitive science program. He has written extensively on computational science and related areas, and has associated interests in emergence, the role of data in contemporary science, and statistical models. His publications include *Extending Ourselves* (Oxford, 2004) and the edited anthology *Emergence* (with Mark Bedau, MIT Press, 2008). Further information can be found on his web site at

<http://people.virginia.edu/~pwh2a/>

Margaret Morrison

Margaret Morrison is professor of philosophy at the University of Toronto. Her work addresses a number of interrelated issues in the history and philosophy of science - specifically the relation between modelling, experimentation and simulation, the nature of emergence in physics, and the ways in which mathematical frameworks can deliver information about concrete systems. Her publications include *Models as Mediators: Essays in the Natural and Social Sciences* (with M. Morgan) (Cambridge, 1999), *Unifying Scientific Theories: Physical Concepts and Mathematical Structures* (Cambridge, 2000) and *Reconstructing Reality: Models, Mathematics and Simulation* (Oxford, 2014, forthcoming).

Cost of the program: EUR 880,-

Lodging in student dormitories is available at approximately EUR 400-450 for the whole duration of the course.

Applicants should submit:

A short educational curriculum vitae

A list of most recent courses and grades or a copy of your diplomas

A one-page statement (in English), briefly outlining your previous work and your reason for attending the USS-SWC

A (sealed) letter of recommendation from your professor, including some comment on your previous work. This letter may also be sent directly by your professor.

A passport photo

Please make sure that all documents arrive in time because we can process only complete applications.

Please send the application form, available on our web site <http://www.univie.ac.at/ivc/SWC>, in advance.

To participate mastering English on a high level is required. For non English native speakers with certificate.

Application deadline: January 31, 2015 (Later applications may be considered if space is still available.)

A letter of admission together with a detailed syllabus will reach successful applicants by mid-February, 2015.

The administration of USS-SWC at the University of Vienna can assist the candidates admitted in applying for funds and in the accreditation of the course, but unfortunately, cannot offer financial assistance. However, for a few gifted applicants who can demonstrate that, despite serious documented efforts, they have not been able to obtain any financial support, in particular due to economic difficulties in their own country, a tuition waiver grant, awarded by the Institute Vienna Circle and the University of Vienna, will be provided.

Applications should be sent to

Professor Friedrich Stadler, Institute Vienna Circle

University Campus, Spitalgasse 2-4, Hof 1, Eingang 1.13

A-1090 Vienna, Austria

For further inquiries, please send email to friedrich.stadler@univie.ac.at or consult the IVC's Web site www.univie.ac.at/ivc/SWC