



SCHLOSS DAGSTUHL  
Leibniz-Zentrum für Informatik

Dr. Yun-Heh Jessica Chen-Bruger  
Heriot-Watt University  
School of Mathematical and Computer Sciences  
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**Prof. Raimund Seidel, Ph.D.**  
*Wissenschaftlicher Direktor*

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Saarbrücken, May 27, 2016

### Invitation to the Dagstuhl Seminar 17091

Dear Dr. Chen-Bruger:

As the Scientific Director of Schloss Dagstuhl, I would like to invite you to participate in a Dagstuhl Seminar on *Computer Science Meets Ecology*. The seminar will be held at Schloss Dagstuhl in Germany at the following address: Oktavie-Allee, 66687 Wadern, from **Sunday, February 26 to Friday, March 03, 2017**. It is organized by the following international team of renowned researchers:

**Benjamin Adams** (University of Auckland, NZ)

**Gustau Camps-Valls** (University of Valencia, ES)

**Thomas Hickler** (Goethe-Universität Frankfurt am Main, DE)

**Birgitta König-Ries** (Universität Jena, DE)

Schloss Dagstuhl is a non-profit association of eleven universities and research organizations. It is dedicated to the advancement of computer science. Since 1990, we have been hosting invitation-only Dagstuhl Seminars and Dagstuhl Perspectives Workshops that bring together the world's leading researchers, practitioners, and young talents to discuss their ideas. Every year about two thousand of them meet in approximately fifty Dagstuhl Seminars and Dagstuhl Perspectives Workshops, fostering new directions and fields in computer science.

You can learn more about the seminar at <http://www.dagstuhl.de/17091> and from the description accompanying this letter. The final program will be arranged during the seminar. Although we invite you to give a talk, organizers may decide to limit the number of talks to provide enough room for discussions.

Some words about logistics: this is a 5-day seminar and we expect you to arrive on Sunday afternoon and depart the following Friday afternoon. The fee

*Geschäftsanschrift*

Schloss Dagstuhl  
Leibniz-Zentrum für Informatik GmbH  
Oktavie-Allee  
66687 Wadern | Germany

*Vorsitzender des Aufsichtsrates*

Prof. Dr. -Ing. Dr. h. c. Stefan Jähnichen

*Geschäftsführung*

Prof. Raimund Seidel, Ph.D.

Heike Meißner

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of 50 euro per day includes accommodation in a single room in our center, full board, and all taxes.

We would be delighted if you would agree to contribute to this Dagstuhl Seminar. Please return your registration form as soon as possible. Six weeks ahead of the seminar we will publish a list of participants on the seminar homepage at <http://www.dagstuhl.de/17091> and send you detailed travel instructions by email.

If you have any questions, do not hesitate to contact us at [service@dagstuhl.de](mailto:service@dagstuhl.de). *Please include your seminar number 17091 in the subject line of all your messages.*

Sincerely yours,

Prof. Raimund Seidel, Ph.D.  
Scientific Director

**REGISTRATION FORM****DAGSTUHL SEMINAR: 17091  
GUEST NUMBER: 64819**

Please complete, sign, and e-mail a scanned version of this form to [service@dagstuhl.de](mailto:service@dagstuhl.de). Alternatively, you may fax it to +49 681 302-4397 (no cover sheets, please) or mail the original to the following address:

**Geschäftsstelle Schloss Dagstuhl  
Universität des Saarlandes  
Campus E1 1  
66123 SAARBRÜCKEN  
GERMANY**

Title: Computer Science Meets Ecology  
 Arrival Date: Sunday, February 26, 2017  
 Departure Date: Friday, March 03, 2017  
 Costs: 50 euro per day, includes full board in a single room. Payable at the end of stay.

**Yes, I will attend** Arrival / Departure date (if not as above) \_\_\_\_\_

If you must cancel your registration, please do so **no** later than January 29, 2017.

**No, I will not attend**

**Please correct and complete your guest record:**

Title Family name First name Academic title Date of birth / Nationality	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms. <span style="float: right;">personal data</span> Chen-Bruger Yun-Heh Jessica <input checked="" type="checkbox"/> Dr. <input type="checkbox"/> Dr.-Ing. <input type="checkbox"/> Prof. <input type="checkbox"/> Prof. Dr. <input type="checkbox"/> Prof. Dr.-Ing. /
Name Department Address extension Street Post box Zip code City Country	<span style="float: right;">company/institution</span> Heriot-Watt University School of Mathematical and Computer Sciences  Riccarton Campus  EH14 4AS Edinburgh GB
Fax E-mail Homepage	<span style="float: right;">contact</span> y.j.chenburger@hw.ac.uk <a href="http://www.hw.ac.uk/schools/mathematical-computer-sciences/staff-directory/dr-yun-heh-jessica-chenburger.ht">http://www.hw.ac.uk/schools/mathematical-computer-sciences/staff-directory/dr-yun-heh-jessica-chenburger.ht</a>
Extras and remarks	<input type="checkbox"/> vegetarian <input type="checkbox"/> extra long bed <input type="checkbox"/> allergic to...

\_\_\_\_\_  
Date, Signature

2016-05-27, SBB

# Computer Science Meets Ecology

February 26 – March 3, 2017, Schloss Dagstuhl, Wadern, Germany

**Organizers:**

**Benjamin Adams (University of Auckland, NZ)**

**Gustau Camps-Valls (University of Valencia, ES)**

**Thomas Hickler (Goethe-Universität Frankfurt am Main, DE)**

**Birgitta König-Ries (Universität Jena, DE)**

In his pioneering work, Jim Gray identified the 4th scientific paradigm, arguing that modern science needs computer supported research. Recent developments in many scientific disciplines suggest this new paradigm to be powerful: Huge amounts of heterogeneous, unstructured and multisource data of different modalities can now be collected routinely, sometimes in a fully automatic manner and be processed to extract knowledge and make inferences.

A discipline that shows great potential but also the challenges of this 4th scientific paradigm is Ecology. Ecology is the study of the interactions amongst organisms and with their physical environment. For a long time, ecological analyses have been primarily realized locally both with respect to the geographical and phenomenological areas of investigation. Today, scientists are increasingly interested in quantifying ecological relations at larger scales or globally and can consider multiple dimensions of interactions between atmospheric, oceanic, and terrestrial processes. Due to the possibilities to record, store and process data ubiquitously, the increase in data resolution and quality as well as the international efforts to document the global distribution of biodiversity, new opportunities arise. These data will enable us to answer questions that are of fundamental importance for the future of our planet.

The aim of the Dagstuhl Seminar is to establish links between (geo-)ecologists, ecoinformaticians and computer scientists in order to leverage computer science expertise for ecology and to identify avenues of future research in computer science of particular importance to ecology.

Based on three concrete use cases regarding automated long-term monitoring of biodiversity, Global Change and Macroecology, and modelling ecosystem and Earth system processes, which we have identified together with researchers working in the field of Ecology, we want to explore particular challenges with respect to

- obtaining and preserving data (Use case: automated long-term monitoring of biodiversity)
- pattern-recognition in highly dimensional and geo-tagged data sets (Use case: Global Change Ecology), and
- model development and model-data-confrontation (Use case: Modelling ecosystem and Earth system processes)

More detailed information about the use cases and relevant areas of computer science can be found here <http://www.dagstuhl.de/fileadmin/redaktion/Programm/Seminar/17091/17091-Description.pdf>.

The seminar has two main objectives:

1. Joint authoring of a book on the state of the art and challenges in the intersection of computer science and ecology. This book shall be based on the results of the working groups. Based on the example scenarios it will introduce three important classes of problems in Ecology. For these, it will provide an introduction to available tools, and will outline challenges for future research. Such a book can serve as a handbook for ecologists wanting to leverage computer science in their research but also as a roadmap for future research activities.
2. Define project ideas for cooperation between Computer Scientists and Ecologists and identify suitable funding schemes.

Together, these two objectives will serve to intensify cooperation between the disciplines involved.