

# Yannick Wurm

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I aim to understand the genetic mechanisms involved in the evolution of animal societies. I currently use genomics and bioinformatics to characterize genes involved in behavioral decisions and caste-specific developmental fates in ants.

From January 2012 I will be a lecturer (UK equivalent of assistant prof.) at Queen Mary University London.

## EXPERIENCE

- 2010- POSTDOCTORAL RESEARCH ASSOCIATE  
with Prof. Laurent Keller, Department of Ecology & Evolution, University of Lausanne, Switzerland
- 2010- EMBEDDED BIOINFORMATICIAN  
with Prof. Ioannis Xenarios, Vital-IT, Swiss Institute of Bioinformatics, Lausanne, Switzerland
- 2006-2009 MEMBER OF SWISS INSTITUTE FOR BIOINFORMATICS PHD TRAINING NETWORK  
Courses: Statistical analysis applied to genome and proteome analyses, Probability theory & network inference, Perl best practices, Protein information databases
- 2005-2009 PHD, "SOCIOGENETICS OF FIRE ANTS"  
with Prof. Laurent Keller, Department of Ecology & Evolution, University of Lausanne, Switzerland  
Foci: see publications. I spent 10% of my research time with the ants, 20% in the wet lab (mainly for gene expression analyses), and 70% on the computer (Ruby & Perl for scripting, R & Bioconductor for analyses)
- 2004 RESEARCH TRAINEE (6 MONTHS)  
with Prof. Richard Roy, Department of Biology, McGill University, Montreal, Canada  
Foci: Immunoprecipitating targets of the Notch transcription factor from specific cells of *C. elegans*, crossing & mapping *C. elegans* gut cell number mutants
- 2003 JUNIOR SOFTWARE DEVELOPER (6 MONTHS)  
with Nicolas Zinovieff, Krugazor Software, Paris, France  
Focus: development of a program for visual representation of dynamic models based on ordinary differential equations (implemented in C & Objective-C)
- 2001-2004 ENGINEERING DEGREE IN BIOINFORMATICS AND MODELING (MASTERS-EQUIVALENT)  
National Institute of Applied Sciences, INSA Lyon, France  
Courses included: biostatistics, genomic data analysis, comparative genomics, population biology modeling, bio-inspired computing, biochemistry, molecular biology and computer science  
Major project: Modelling genetic regulation of *E. coli* genomic superhelicity using piecewise-linear differential equations. Supervisors: Drs. H. de Jong, J. Geiselman and H. Charles
- 1999-2001 GENERAL ENGINEERING STUDIES  
National Institute of Applied Sciences, INSA Lyon, France  
Courses included: Mathematics, Physics & Chemistry
- 1999 SCIENTIFIC BACCALAUREATE (FOCUS: LIFE SCIENCES & MATHEMATICS)  
Lycée international de Gerland (secondary school), Lyon, France

## DISTINCTIONS & GRANTS

- 2011 Society for Molecular Biology & Evolution Postdoc travel award (\$2500)
- 2010 PhD award: Prix de la faculté de biologie et de médecine de l'Université de Lausanne (1,000 CHF)
- 2009 Research grant from Infectigen: ULTRA-HIGH THROUGHPUT SEQUENCING FOR DISCOVERY AND CHARACTERIZATION OF VIRAL GENOMES IN FIRE ANTS. With E. Zdobnov, L. Keller, D. Shoemaker, S. Valles (100,000 CHF)
- 2008 Grants from Swiss Zoological Society and Fondation du 450<sup>ième</sup> anniversaire de l'Université de Lausanne to attend the International Congress of Entomology (3,500 CHF)
- 2008 Ecogenics innovation award for oral communication at Biology08 (400 CHF)
- 2004 Grants from Région Rhône-Alpes and Office Franco-Québécois de la Jeunesse to visit Prof. Richard Roy's laboratory at McGill University (2,800 euros)
- 2002 Apple Computer scholarship to attend the WorldWide Developer Conference in California (\$1,600)
- 1999 Scientific baccalaureate honors: "Mention Bien"

## PUBLICATIONS (° indicates corresponding authorship)

- in press Riba-Grognuz O°, Keller L, Falquet L, Xenarios I, Wurm Y°. **Visualization and quality assessment of *de novo* genome assemblies**. Bioinformatics.
- in press Gadau J, Helmkampf M, Nygaard S, Roux J, Simola DF, Smith CR, Suen G, Wurm Y, Smith CD. **The genomic impact of 100 million years of social evolution in seven ant species**. Trends in Genetics. [cover photo]
- 2011 Hunt B, Ometto L, Wurm Y, Shoemaker D, Yi SV, Keller L, Goodisman MAD°. **Relaxed selection is a precursor to the evolution of phenotypic plasticity**. PNAS, 108(38): 15936-15941
- 2011 Nygaard S°, Zhang G, Schiøtt M, Li C, Wurm Y, Hu H, Zhou J, Ji L, Qiu F, Rasmussen M, Pan H, Hauser F, Krogh A, Grimmelikhuijzen CJP, Wang J, and Boomsma JJ. **The genome of the leaf-cutting ant *Acromyrmex echinator* suggests key adaptations to advanced social life and fungus farming**. Genome Research, 21: 1339-1348.
- 2011 Wurm Y°. **Behind the scenes of an ant genome project**. Formosan Entomologist, 31(2):149-156.
- 2011 Wurm Y° et al. **The Genome of the Fire Ant *Solenopsis invicta***. PNAS, 108(14):5679-5684.
- 2011 Gotzek D, Robertson H, Wurm Y, Shoemaker D. **Odorant binding proteins of the Red Imported Fire Ant, *Solenopsis invicta*: An example of the problems facing the analysis of widely divergent proteins**. PLoS ONE 6(1): e16289.
- 2010 Wurm Y°, Keller L. **Parasitoid Wasps: From natural history to genomic studies**. Current Biology 20:R242-244.
- 2010 Wurm Y°, Wang J, Keller L. **Changes in reproductive roles are associated with changes in gene expression in fire ant queens**. Molecular Ecology 19(6).
- 2009 Wurm Y°, Uva P, Ricci F, Wang J, Jemielity S, Iseli C, Falquet L, Keller L. **Fourmidable: a database for ant genomics**. BMC Genomics 10(5):5.
- 2007 Wang J, Jemielity S, Uva P, Wurm Y, Gräff J, Keller L. **An annotated cDNA library and microarray for large-scale gene-expression studies in the ant *Solenopsis invicta***. Genome Biology 8:R9.
- 2007 Wurm Y, Wang J, Keller L. **Behavioral genomics: A, bee, C, G, T**. Current Biology 17:R51-3.
- 2005 Zerlin M, Greiffenberg L, Wurm Y, Winkler I, Kreusel D, Toemoe S, Ballabas L, Martin J. **CRYOSTOCK, a software for Cell Culture Management**. ESACT Proceedings: Animal Cell Technology Meets Genomics.

**REVIEWER** for: Molecular Biology and Evolution, BMC Evolutionary Biology, BMC Genomics, Molecular Ecology, Insect Molecular Biology, Insectes Sociaux, Proceedings B, Nucleic Acids Research, Bulletin of Insectology, Insectes Sociaux.

**MEDIA COVERAGE** Collected at <http://yannick.poulet.org/pressCoverage>

## REFERENCES

- Prof. Ioannis Xenarios, Director, Uniprot & Vital-IT, Swiss Institute of Bioinformatics  
 Prof. Laurent Keller, Director, Department of Ecology & Evolution, University of Lausanne  
 Prof. Marc Robinson-Rechavi, Department of Ecology & Evolution, University of Lausanne  
 Prof. Richard Roy, Department of Biology, McGill University

## INVITED ORAL PRESENTATIONS

- 2012/09 European Conference of Apidologie (EurBee 5), Halle an der Saale
- 2012/06/18 Workshop on Evolutionary & Ecological Genomics, Adelboden
- 2012 Centre for Social Evolution, University of Copenhagen
- 2011/07/31 Laboratory of Insect Ecology, Okayama University
- 2011/06/29 International Social Insect Genomics Research Conference, Shenzhen
- 2011/05/06 Communication in Social Insects, National Taiwan University, Taipei
- 2011/04/11 Laboratoire de Biométrie et Biologie Évolutive, Lyon
- 2011/03/31 Les Doctoriales, Lausanne
- 2011/03/29 UCL Department of Genetics Ecology & Environment, London
- 2010/10/31 Jakarta Ruby Brigade meeting, Indonesia
- 2010/08/31 2nd UK RAD Sequencing meeting, Edinburgh
- 2009/01/15 The Past, Present and Future of Ant Genomics, Arizona State University
- 2008/12/01 Interaction Seminar, Zurich
- 2008/10/23 Symposium of Ecology and Evolution Doctoral Students, Lausanne

## CONFERENCE PRESENTATIONS

Wurm Y, Wang J, Shoemaker D, Keller L **The Architecture of a Trait Underlying Social Conflict:**

2010 International Union for the Study of Social Insects (poster);  
2010 + 2011 Society for Molecular Biology and Evolution (talk)

Wurm Y, Wang J, Nicolas M, Keller L, **Metamorphosis and gene expression in fire ants** (talk):

2009 European Society for Evolutionary Biology

Wurm Y, Wang J, Ross KG, Keller L, **Genomic response to social restructuring of fire ant colonies** (talks):

2008 International Congress of Entomology; 2008 Biology08; 2007 Regulation and Variability of Animal Genome Expression; 2007 Integrative Post Genomics; 2007 European Society for Evolutionary Biology

Wurm Y, Wang J, Jemielity S, Keller L, **Fire ant genomics:**

2007 Biology07 (poster); 2006 International Union for the Study of Social Insects (talk)

Presented by others:

2011 Riba-Grognuz O, Keller L, Falquet L, Xenarios I, Wurm Y. **Visualization and quality assessment of *de novo* genome assemblies of emerging model organisms**. Swiss Institute for Bioinformatics Days. **Best Poster Prize** (out of 85).

2010 Buechel SD, Wurm Y, Keller L. **Selective death among female brood of the fire ant *Solenopsis invicta*?** IUSSI

2010 Ingram KK, Meier R, Bloch G, Wurm Y. **Sociogenomics of the ant circadian clock**. IUSSI

Wang J, Wurm Y, Nipitwattanaphon M, Riba-Grognuz O, Shoemaker D, Keller L. **Building a genetic map for *Solenopsis invicta* by sequencing restriction-site associated DNA (RAD) markers**. IUSSI

2010 Manfredini F, Shoemaker D, Wang J, Wurm Y, Keller L, Grozinger CM. **Genomic analyses of social organization and viral infection in fire ants**. IUSSI

2009 Wang J, Wurm Y, Harshman K, Xenarios I, Keller L. **Pilot 1x short-read sequencing of *Solenopsis invicta* using the Illumina Platform**. The Past, Present and Future of Ant Genomics

2008 Nicolas M, Wang J, Wurm Y, LaMendola C, Keller L. **Developmental time course in fire ants**. Society for Molecular Biology and Evolution

2008 Wang J, Nicolas M, Wurm Y, Keller L. **Developmental time course of metamorphosis in fire ants**. IUSSI European Meeting

2006 Wang J, Jemielity S, Uva P, Wurm Y, Keller L. **Genomic analysis of ant colony behavior**. IUSSI

## TEACHING

2012/06 One week workshop on Bioinformatics for Ecological & Evolutionary Genomics.

Master's project supervision: H. Darras (2011), P. Siguier (2010), S. Buechel (2009)

Bachelor group project supervision: B. Laurency, P. Chatelain and B. Hurrell (2009)

2008 R FOR GENOMICS lecture given during the INTRODUCTION TO R course for graduate and post-graduate students of the Conférence Universitaire de Suisse Occidentale

2006-2009 Developing and teaching undergraduate practicals at Université de Lausanne (30 hours per year):

BIOINFORMATICS: introductions to sequence characterization (using BLAST, web databases including Uniprot and protein structure modeling), comparative genomics (using ensembl and binding-site prediction), microarray analyses (using limma for analysis and point & click tools for clustering, visualisation and GO analyses)

STATISTICS: probabilities, statistical tests, linear modeling, data manipulation in R

EXPERIMENTAL DESIGN: analysing real data sets, designing experiments while taking statistical power and subsequent analyses into account.

## FURTHER EXPERIENCE

Since 2010 Supervising one full-time laboratory technician for assembly validation and followups

Since 2010 Project leader for SequenceServer, an easy to deploy and use open source web wrapper for BLAST.

2009-2010 Supervising two full-time bioinformaticians (one for genome assembly, one for R-based development of gene set analysis tools)

2008 Supervised one full-time bioinformatician for perl & web development of tools for ant EST assembly and annotation (including for <http://fourmidable.unil.ch>)

2007 Vice President Public Relations of the UNIL/EPFL Toastmasters International club

Since 2006 Webmaster for the Fourmidable ant genomics database.

Since 2003 Webmaster for a watercolor artist <http://www.danielefraboulet.com>

2003-2007 Webmaster for a biotech startup <http://www.excellgene.com>

2002-2003 Website project leader for the INSA Biosciences department, <http://biosciences.insa-lyon.fr>

2002-2003 Twelve days with Apple Computer France: demonstrating iPod, and UNIX and MacOS X development

Summer 2001 Work student at Aventis Pharma in Hoechst, Germany. Cell culture and software specification

Summer 2000 Work student at Astrazeneca in Södertälje, Sweden. Data entry and laboratory work

## ADDITIONAL INFORMATION

Lived in France (9 years), USA (9 years), Switzerland (6 years), Germany (5 years), Canada (1 year) and Indonesia (1 year).

Fluent in English, French and German. French & German citizenship. Swiss "C" permit permanent residency.

Member of: The International Union for the Study of Social Insects,  
The Society for the Study of Evolution  
The Swiss Zoological Society

Interests: Saxophone (Jazz), Martial arts (Suisse Shotokan Karate black belt), Cycling & winter sports