

Silvia Ghirotto

Personal Information

Date and Place of Birth: December 12, 1984, Rovigo, Italy

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Mailing Address: Department of Life Sciences and Biotechnologies, University of Ferrara, Via Borsari 46, 44121, Ferrara, Italy.

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Education

- 2009-2011 Ph.D. in Evolutionary Biology, University of Ferrara. (Supervisor: Prof. Guido Barbujani. Thesis: Genealogical inferences based on comparison of modern and ancient DNA).
- 2008 Master Degree in BioMolecular Science at University of Ferrara, with final mark 110/110 cum laude. (Supervisor: Prof. Guido Barbujani. Thesis (in Italian): Relazioni genealogiche tra Sardi nuragici e popolazioni moderne: stima di parametri evolutivi.)
- 2006 Degree in Biological Science at University of Ferrara, with final mark 110/110 cum laude. (Supervisor: Prof. Guido Barbujani. Thesis (in Italian): Relazioni genealogiche tra sequenze mitocondriali neandertaliane, cro-magnon ed europee moderne.)
- 2003 Diploma di Perito Chimico Industriale (General Certificate of chemistry engineer) with final mark 95/100 at "Istituto Tecnico Industriale Statale F.Viola " of Rovigo.

Work experiences

- 2013-present European Research Council fellowship, University of Ferrara. "Meeting Darwin's last challenge: toward a global tree of human languages and genes (LANGELIN)".

2011 – 2013 Research fellowship at the Department of Life Sciences and Biotechnologies, University of Ferrara, “Genetic data analysis and simulation of demographic processes”.

2009 – 2011 Research fellowship at the Department of Biology and Evolution, University of Ferrara, “Biostatistical Analysis of Clinical Data”.

Teaching experiences

February 2013-June 2013 Teaching Assistant of Genetics (Prof Guido Barbujani). University of Ferrara

February 2013-June 2013 Teaching Assistant of Population Genetics (Prof Guido Barbujani). University of Ferrara

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February 2012-June 2012 Teaching Assistant of Population Genetics (Prof Guido Barbujani). University of Ferrara

September 2011-June 2012 Tutor of Genetics. University of Ferrara

July 2011 Teacher Assistant at the Summer School In Conservation Genetics Of Marine Organisms, Chioggia (Italy)

February 2011-June 2011 Teaching Assistant of Population Genetics (Prof Guido Barbujani). University of Ferrara

September 2010-June 2011 Tutor of Genetics. University of Ferrara

September 2009-June 2010 Tutor of Genetics. University of Ferrara

Coursework

2012 *Perl for Bioinformatics*. Courses and Schools, CINECA HPC (Bologna, Italy).

2011 *Python for computational science*. Courses and Schools, CINECA HPC (Bologna, Italy).

2011 *Computational Molecular Evolution*. Wellcome Trust Advanced Course, at the Wellcome Trust Genome Campus, Hinxton, Cambridge.

2008 *Dal C alla programmazione ad oggetti in C++*. Courses and Schools, CINECA HPC (Bologna, Italy).

Attended Workshops

- 2013 *Advances in Phylogenetic Linguistics - International Workshop*. Ragusa Ibla (Italy), 15-17 July
- 2013 *Approximate Bayesian Computation in Rome*. Rome (Italy), 30-31 May
- 2013 *Genetic diversity and origin of Europeans*. Geneva (Switzerland), 15-17 January
- 2012 *Stephen J. Gould's Legacy: Nature, History, Society*. Venice (Italy), 10-12 May
- 2012 *A day with ancient DNA*. Florence (Italy), 22th March
- 2012 *Genetic History & Medieval Studies - International Workshop*. Vienna (Austria), 30-31 January
- 2011 *Human evolution, migration and history revealed by genetics, immunity and infection*. The Royal Society, London (UK), 5-6 June

Additional Research Experience

- 2010 Research fellowship at the Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany. (for the DAAD (the German Academic Exchange Service) program)

Additional Academic Seminars

- 2012 *Dalla storia dell'eugenetica alla biologia della "invenzione delle razze": riflessioni sulle basi delle nostre differenze biologiche e culturali*. University of Milan
- 2011 *Human genetic variation*. International Master's Degree in Design for Cooperation and Sustainable Development. Florence
- 2010 *Qualche dato sull'evoluzione dell'uomo*. University of Padua

Master Thesis Tutoring

- 2011-2012 *"Demografia delle popolazioni della Via della Seta ricostruita da dati genetici"*. Candidate: Irene Dall'Ara. University of Ferrara
- 2009-2010 *"Evidenze genomiche di una uscita dell'uomo dall'Africa attraverso una rotta meridionale"*. Candidate: Luca Penso Dolfin. University of Ferrara

- 2008-2009 *“Studio delle relazioni genealogiche fra Neandertaliani, Cro-Magnon ed Europei moderni”*. Candidate: Francesca Tassi. University of Ferrara
- 2008-2009 *“Continuità e discontinuità genealogiche attraverso 2,500 anni nella popolazione Toscana”*. Candidate: Erica Fumagalli. University of Milan-Bicocca
- 2008-2009 *“Il DNA mitocondriale in sardegna dall'eta' del bronzo ad oggi: Relazioni genealogiche tra Sardi nuragici e popolazioni moderne”*. Candidate: Francesco Paparazzo. University of Milan

Thesis Tutoring, Bachelor Program

- 2012-2013 *“Uscita dei primi umani dall’Africa: un test di due ipotesi”*. Candidate: Lisa De Santi. University of Ferrara

Grants and Awards

- 2013 Publication of the PhD thesis in the Annals of the Ferrara University as the best thesis in Evolutionary and Environmental Biology of 2012
- 2012 Best PhD Thesis in the field of Genetics (Premio AGI/Zanichelli 2012)
- 2011 Poster award (“Origins and Evolution of the Etruscans’ DNA”) within the Joint Meeting AGI-SIBV-SIGA 2011, Assisi (Italy)
- 2009 Vigoni Programme Grant for Italian-German collaborative projects. Italian tutor: Prof. Guido Barbujani, German tutor: Dr. Brigitte Pakendorf

Memberships

- Associazione Genetica Italiana - AGI
- Italian Society for Evolutionary Biology - SIBE (Council member, Secretary)
- Society for Molecular Biology and Evolution - SMBE

Contributed presentation

- 2013 **Silvia Ghirotto**, Cristina Guardiano, Francesca Tassi, Andrea Benazzo, Giuseppe Longobardi, and Guido Barbujani. *Across language families: Exploring the relationships between linguistic and genomic diversity in Europe*. Oral Presentation in: “Associazione Genetisti Italiani 2013”, Cortona (Italy).
- 2013 **Silvia Ghirotto**, Cristina Guardiano, Francesca Tassi, Andrea Benazzo, Giuseppe Longobardi and Guido Barbujani. *Across language families: Exploring the*

- relationships between linguistic and genomic diversity in Europe*. Invited lecture in: "Advances in Phylogenetic Linguistics - International workshop. Ragusa Ibla (Italy)"
- 2012 **Silvia Ghirotto**, Massimo Mezzavilla, Francesca Tassi and Guido Barbujani. *Testing for a Southern route of early human dispersal from Africa*. Poster in: "Federazione Italiana delle Scienze della vita 2012", Rome (Italy).
- 2012 **Silvia Ghirotto**, Francesca Tassi, Erica Fumagalli, Vincenza Colonna, Martina Lari, Ermanno Rizzi, David Caramelli, Guido Barbujani. *Origins and Evolution of the Etruscans' DNA*. Poster in: "Society for Molecular Biology and Evolution 2012", Dublin (Ireland).
- 2011 **Silvia Ghirotto**, Francesca Tassi, Erica Fumagalli, Vincenza Colonna, Martina Lari, Ermanno Rizzi, David Caramelli, Guido Barbujani. *Origins and Evolution of the Etruscans' DNA*. Poster in: "Joint Meeting AGI-SIBV-SIGA 2011", Assisi (Italy).
- 2010 **Silvia Ghirotto**, Francesca Tassi, Andrea Benazzo, Guido Barbujani. *No evidence of Neandertal admixture in Cro-Magnoid and modern European mitochondrial genomes*. Oral presentation in: "Società Italiana di Biologia Evoluzionistica 2010", Milan (Italy).
- 2010 **Silvia Ghirotto**, Francesca Tassi, Andrea Benazzo, Guido Barbujani. *Testing for the genealogical relationship among Modern, Cro-Magnoid and Neandertal Europeans by approximate bayesian computation*. Poster in: "Society for Molecular Biology and Evolution 2010", Lyon (France).
- 2009 **Silvia Ghirotto**, Stefano Mona, Andrea Benazzo, Francesco Papparazzo, David Caramelli, and Guido Barbujani. *Inferring Genealogical Processes from Patterns of Bronze-Age and Modern DNA variation in Sardinia*. Poster in: "Federazione Italiana delle Scienze della vita 2009", Riva del Garda (Italy).

Journal articles

Massimo Mezzavilla and **Silvia Ghirotto**. *NeON: an R package to estimate human effective population size and divergence time from patterns of linkage disequilibrium between SNPs*. 2013. In preparation.

Andrea Benazzo, **Silvia Ghirotto**, Sibelle Torres Vilaca and Sean M Hoban. 2013. *Using ABC and microsatellite data to detect multiple introductions of invasive species from a single source*. In preparation.

Giuseppe Longobardi, **Silvia Ghirotto**, Cristina Guardiano, Francesca Tassi, Andrea Benazzo, and Guido Barbujani. *Across language families: Exploring the relationships between linguistic and genomic diversity in Europe*. In preparation.

Marilia O Scliar, Mateus H Gouveia, Andrea Benazzo, **Silvia Ghirotto**, Nelson J Fagundes, Thiago P Leal, Wagner CS Magalhães, Latife Pereira, Maira R Rodrigues, Giordano Soares-Souza, Lilia Cabrera, Douglas Berg, Robert H Gilman, Giorgio Bertorelle, Eduardo Tarazona-Santos. 2013. *Amazon Yunga Natives split from Andeans less than 5000 YBP: implications for South American prehistory*. Submitted

Martina Lari, Fabio Di Vincenzo, Andrea Borsato, **Silvia Ghirotto**, Mario Micheli, Carlotta Balsamo, Carmine Collina, Gianluca De Bellis, Giacomo Giacobini, Elena Gigli, John C. Hellstrom, Antonella Lannino, Alessandra Modi, Alessandro Pietrelli, Elena Pilli, Antonio Profico, Oscar Ramirez, Ermanno Rizzi, Stefania Vai, Donata Venturo, Marcello Piperno, Carles Lalueza Fox, Guido Barbujani, David Caramelli & Giorgio Manzi. 2013. *The Neanderthal in the karst: dating, paleogenetics and morphology of the skeleton from Altamura (Italy)*. Submitted.

Guido Barbujani, **Silvia Ghirotto**, Francesca Tassi. 2013. *Nine things to remember about human genome diversity*. *Tissue Antigens*. 82,155-164.

Francesca Tassi, **Silvia Ghirotto**, David Caramelli and Guido Barbujani. 2013. *Genetic Evidence Does Not Support An Etruscan Origin In Anatolia*. *American Journal of Physical Anthropology*. 152, 11-18

Silvia Ghirotto, Francesca Tassi, Erica Fumagalli, Vincenza Colonna, Anna Sandionigi, Martina Lari, Stefania Vai, Emmanuele Petiti, Giorgio Corti, Ermanno Rizzi, Gianluca De Bellis, David Caramelli and Guido Barbujani. 2013. *Origins and evolution of the Etruscans' DNA*. *PLoS One*. 8(2):e55519

Silvia Ghirotto, Luca Penso-Dolfin and Guido Barbujani. 2011. *Genomic evidence for an African expansion of anatomically-modern humans by a Southern route*. *Human Biology*. 83, 477-489.

Silvia Ghirotto, Francesca Tassi, Andrea Benazzo, Guido Barbujani. 2011. *No evidence of Neandertal admixture in Cro-Magnoid and modern European mitochondrial genomes*. *American Journal of Physical Anthropology*. 146, 242-52

Guido Barbujani and **Silvia Ghirotto**. 2010. *Origin of the Tuscans*. Standard Article in: "ENCYCLOPEDIA OF LIFE SCIENCES".

Silvia Ghirotto, Stefano Mona, Andrea Benazzo, Francesco Papparazzo, David Caramelli, Guido Barbujani. 2010. *Inferring Genealogical Processes from Patterns of Bronze-Age and Modern DNA variation in Sardinia*. *Molecular Biology and Evolution*. 27, 875-86.

Silvia Guimaraes, **Silvia Ghirotto**, Andrea Benazzo, Lucio Milani, Martina Lari, Elena Pilli, Elena Pecchioli, Francesco Mallegni, Barbara Lippi, Francesca Bertoldi, Sauro Gelichi, Antonella Casoli, Elise M. S. Belle, David Caramelli, Guido Barbujani. 2009 *Genealogical discontinuities among Etruscan, Medieval and contemporary Tuscans*. *Molecular Biology and Evolution*. 26, 2157-66

Elise M. S. Belle, Andrea Benazzo, **Silvia Ghirotto**, Vincenza Colonna, Guido Barbujani. 2009. *Comparing models on the genealogical relationships among Neandertal, Cro-Magnoid and modern Europeans by serial coalescent simulations*. *Heredity*. 102, 218-25.

Research Skills

Computer: Knowledge of Windows, and Unix operating system. Experience in working with High Performance Computing facilities. Deep knowledge of R statistical package , good knowledge of Python and Perl and basic knowledge of C.

Population Genetics: Arlequin, Clustal, DnaSp, Network, MEGA, Plink. Experience in phylogenetic and simulation programs, analysis of demographic model of evolution, and in implementing ABC techniques (for contemporary and serial sampling). Experience in analysis of Next Generation Sequencing data and related tools.

Simulation: IM, Beast, Simcoal, SerialSimcoal, ms, Bayesian SerialSimcoal, DIYABC, ABCToolbox. Good scientific communication and divulgation skills.

Research Interest

My main research interest regards the evolution of our species, in particular the understanding of the demographic processes underlying human expansion Out of Africa, and the genetic and genealogical relationships between human populations along their evolutionary history. All these processes left a signature in individuals' genome, thus a properly analysis of genetic and genomic data has revealed to be a useful, if not essential, tool to reconstruct our past. To do this I make use of population genetic models through Approximate Bayesian Computation methods and other model-based techniques, for both contemporary and ancient samples.

I'm also interested in phylogenetics inference of demographics and evolutionary parameters; in ancient DNA; in molecular evolution; selection; coalescent theory and stochastic processes.