Gonnet is Not Only about Molecular Evolution (GNOME) 2014

Festschrift on the Occasion of the Retirement of Prof. Gaston H. Gonnet

Preface

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It is an immense pleasure to present this Festschrift on the occasion of Professor Gaston H. Gonnet's retirement. This volume accompanies the associated symposium *Gonnet is Not Only about Molecular Evolution* (GNOME) on the 4th of July 2014 at ETH Zurich.

Born in Uruguay, Gaston completed his undergraduate studies in Montevideo before going to Waterloo, Canada, where he completed his Master's and, just less than two years later, his PhD degree under the supervision of J. Alan George.

Over the course of his career, first at the Pontifical Catholic University of Rio de Janeiro, then later at the University of Waterloo, and since 1990 at ETH Zurich, Gaston H. Gonnet made seminal contributions to at least three fields. First, together with Keith Geddes, he created the Maple computer algebra system whose rapid adoption in the research community led to founding of the Maplesoft software company. The impact of this work is reflected in the thousands of citations to Maple's various reference books.

Second, Gaston made several influential contributions to text analysis and algorithms on strings, culminating with the digitalization of the Oxford English Dictionary and the founding of the Open Text Corporation with Tim Bray and Frank Tompa. Their

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search engine was the first to systematically index all the text of the web, and powered early versions of the Yahoo website.

Third, as a pioneer of evolutionary bioinformatics, Gaston performed some of the earliest large-scale analyses of molecular sequences with Steven Benner. Together, they established first models of amino-acid substitutions, insertions and deletions widely used for sequence alignment and phylogenetic inferences.

Gaston Gonnet is also an accomplished teacher and mentor. His course Modeling and Simulation is an acclaimed rite of passage for science-minded CS students at ETH Zurich and became a subject of his book "Scientific Computation" co-authored by Ralf Scholl and published by Oxford University Press in 2009. Gaston was instrumental in the establishment of the successful Computational Biology and Bioinformatics joint Master's programme at ETH and the University of Zurich. He has supervised 19 PhD students, of which roughly two thirds have pursued their careers in academia.

The breadth of these interests and accomplishments are reflected in this Festschrift and the oral presentations of the GNOME 2014 symposium.

In Chapter 1, Benner *et al.* look back at the groundbraking collaboration between the Benner and Gonnet groups a quarter century ago and its impact as the genomic revolution unfolded.

In Chapter 2, Wittwer, Piližota *et al.* revisit an old favourite problem of Gaston Gonnet—all-against-all protein comparisons—and a new present way of substantially accelerating this fundamental procedure with nearly no negative impact on sensitivity.

In Chapter 3, Zhang *et al.* provide a survey of methods to transfer functional knowledge across genes and species in a phylogenetic-aware way.

In Chapter 4, Manuel Gil presents a fast and accurate estimator of covariances between pairwise evolutionary distances, which happens to be another one of Gaston's favourite topics.

In Chapter 5, Maria Anisimova discusses the relevance of bioinformatics and modeling in molecular evolution to applications in industry—from health and pharmacology to biotechnology, agriculture and ecology.

The Festschrift concludes with Chapter 6, the summary of another quarter-century retrospective: Ricardo Baeza-Yates reviews how the Shift-Or algorithm, one of the

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main result of his PhD thesis supervised by Gaston, helped establish the field of bit-parallelism in string matching and gave rise to subsequent to information retrieval, signal processing, and biological sequence analysis.

Complementary to this Festschrift, the GNOME 2014 symposium features oral presentations by Maria Anisimova (ETH Zurich and Institute of Applied Simulations, ZHAW), Ricardo Baeza-Yates (Yahoo Labs Barcelona), Amos Bairoch (Swiss Institute of Bioinformatics), Niko Beerenwinkel (ETH Zurich), Steven Benner (Foundation for Advanced Molecular Evolution, USA), Laurent Bernardin (MapleSoft, Waterloo, Canada), Felipe Cucker (City University Hong Kong), Christophe Dessimoz (University College London), Walter Gander (ETH Zurich and Baptist University Hong Kong), Michael Monagan (Simon Fraser University), Bernard Moret (EPFL), Chantal Roth (Life Technologies), Joachim von zur Gathen (University of Bonn), Nivio Ziviani (Federal University of Minas Gerais), as well as Gaston Gonnet himself.

On behalf of all festschrift contributors, speakers, and participants of the GNOME celebration, we extend to Gaston our warmest congratulations for a remarkable career and wish him continued health and happiness in his golden years. On behalf of the former and present members of Gaston's research team, we thank him for supporting and empowering us on the thorny-but-gratifying path of academic research.

Zurich and London, June 2014

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