

Preface

Biological research and recent technological advances have resulted in an enormous increase in research data that requires large storage capacities, powerful computing resources, and accurate data analysis algorithms. Bioinformatics is the field that provides these resources to life science researchers. Originally the prerogative of a few biologists who were computer buffs and a few computer scientists who had a passion for life science, bioinformatics has developed into a fully-fledged science with its own specialists, pregraduate and postgraduate studies, as well as international conferences and journals.

In Switzerland, bioinformatics started in the 1980s, when a handful of enthusiastic scientists started developing databases and computational tools that rapidly became accessed and used by researchers from all over the world. While essential for thousands of scientists both in Switzerland and abroad, these computational biology resources were developed for many years without any substantial means. It was only in 1998 that the need for a Swiss bioinformatics infrastructure was recognized and that the Swiss Institute of Bioinformatics (SIB) was created. Even then, the SIB founders were ahead of their time, building an organization of exceptional quality and dynamism. Starting with 20 bioinformaticians in five groups at universities and research institutes in the Lake Geneva area, they were rapidly joined by new professors in major Swiss universities, thus growing into an institution of national importance, recognized worldwide for its state-of-the-art work.

After more than 10 years of existence, the SIB is regarded as one of the leading bioinformatics institutions in the world. Organized as a federation of bioinformatics research groups from Swiss universities and research institutes, the SIB provides services to the life science community

that are highly appreciated worldwide, and coordinates research and education in bioinformatics nationwide. The SIB plays a central role in life science research both in Switzerland and abroad by developing extensive and high-quality bioinformatics resources that are essential for all life scientists. It contributes to the economy and quality of life through the global distribution of its products, by providing state-of-the-art tools to the industry, and by its involvement in pregraduate and postgraduate teaching programs. Knowledge developed by SIB members in areas such as genomics, proteomics, and systems biology is directly transformed by academia and industry into innovative solutions to improve global health.

This astounding concentration of talent in a given field is unusual and unique in Switzerland. This book gives an insight into some of the key areas of activity in bioinformatics in our country, covering both research work and major infrastructural efforts in genome and gene expression analysis, investigations on proteins and proteomes, evolutionary bioinformatics, and modeling of biological systems.

We are grateful to the authors of all chapters for their efforts, patience, and goodwill, without which it would not have been possible to publish this book. We are particularly indebted towards our colleague Dr. Patricia Palagi for her careful proofreading of the whole book; and are grateful to Drs. Lydie Bougueleret, Janet James, Tania Lima, and Ms. Nicole Zaghia, who went over the text of our authors whose English is not always as outstanding as their science. We also acknowledge support from the Swiss State Secretariat for Education and Research, the Swiss universities, federal institutes of technology and research institutes, the Swiss National Science Foundation, as well as several international funding bodies such as the European Research and Development Programmes and the US National Institutes of Health. Finally, we are thankful to all members of the Swiss Bioinformatics Institute, whose relentless work constitutes the core of bioinformatic excellence in Switzerland.

We hope that this book will help readers understand some of the many facets of bioinformatics today, and encourage new scientists to get on board with such a fascinating and challenging field.

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July 2008