

## **Protocells**

**Bridging Nonliving and Living Matter**

edited by Steen Rasmussen, Mark A. Bedau, Liaohai Chen, David Deamer,  
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## Preface

The idea for this book grew out of two international protocell workshops in September 2003. One meeting, at Los Alamos National Laboratory and the Santa Fe Institute, was organized by Steen Rasmussen, Liaohai Chen, David Deamer, David Krakauer, Norman Packard, and Peter Stadler. The other meeting, at the European Conference on Artificial Life (ECAL) in Dortmund, Germany, was organized by Steen Rasmussen and Mark Bedau. We published a short summary of the state of the art of protocell research as reflected in those workshops in early 2004 (Rasmussen et al., 2004), and we planned to collect more details about this research in a longer volume. That plan was the seed for this book. But a series of events intervened, changing and delaying the book.

Those events grew out of the Seventh Artificial Life Conference in Portland, Oregon, organized by Mark Bedau, John McCaskill, Norman Packard, and Steen Rasmussen in August 2000. Coinciding with the millennium, the conference aimed to take stock of the young field of artificial life. Out of the Oregon meeting came a community consensus of specific grand challenges in artificial life. One of these challenges is to create wet artificial life from scratch.

Over the next three years, our activities were a portfolio of projects, most involving, in one way or another, the creation of life from scratch. In 2001 we coined the term *living technology* as an umbrella for our activities. The next year we realized how computer-controlled microfluidics could act as life support for the evolution of minimal chemical systems, and two months later we started creating a new roadmap to protocells. Our meetings led to a proposal for a new Center for Living Technology at which scientific developments in this area could be nurtured and developed along the way to producing practical applications.

The European Commission's program on complex systems funded the first phase of these plans. Just before the first protocell workshops in 2003, we learned that our EC proposal on Programmable Artificial Cell Evolution (PACE) was funded. John McCaskill led the PACE project, which consisted of fourteen European and U.S. partners and included plans for a European Center for Living Technology in Venice.

One of the members of the PACE consortium was the new startup company, Proto-Life Srl., of which Norman Packard and Mark Bedau became CEO and COO. Soon afterwards Los Alamos National Laboratory awarded a complementary grant for a project on Protocell Assembly, led by Steen Rasmussen. While these new activities absorbed our time for a couple of years, this book was on the back burner.

In 2005 Emily Parke agreed to manage the editorial process of producing the book. Our vision of the book had grown in the intervening years, so we solicited chapters from many who had missed the original workshops.

Though it had a convoluted gestation, we hope this book will be both a resource and an inspiration for the exciting and important quest to create life from scratch.

Mark Bedau

Norman Packard

Steen Rasmussen

Venice, Italy, June 2007

#### Reference

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