

MBL-ASU History of Biology Seminar “Theory in Biology”

We will meet from 9:00 – 5:00, coffee break at 10:30 (coffee provided) with lunch from 12:00 – 2:00 . You will have a meal card and all meals are taken in the dining room (except for Sunday when you the dining hall is closed and you will be able to explore on your own).

Schedule (subject to minor change):

May 20: 6:30 pm Welcome Reception/ Dinner in the Cafeteria (small dining room) (for those who can get there in time. Get acquainted session).

May 21: am: The problem of theory in biology—perspectives from history, current concerns and the future of 21st century biology (Jim Collins, Jane Maienschein, Manfred Laubichler).

*** this session will provide a historical overview of the concept of theory in biology, of the history of theoretical biology, the theoretical fragmentation of the life sciences in the 20th century and the current attempts to “advance theory in the life sciences”*

=> the guiding question here is: What has been the role of theory in biology?

May 21 pm: The theoretical conceptual and institutional landscape of the life sciences in the 19th century (Paul Farber, Bob Richards; Janet Browne directing)

*** this session will discuss the context within which biology first emerged as a science in the late 19th century*

=> the theme here is: What were the various resources and problems that first led to the emergence of biology as the science of life and what was the theoretical foundation of this new science?

May 22 am: The multi-dimensional relationship between biology and physics in historical and philosophical perspective (Norton Wise, Evelyn Fox Keller, Fred Kronz and John Beatty)

*** this session will explore the relationship between biology and physics from the late 19th to the early 21st century and focus specifically on how different conceptions of theory in physics and biology have influenced each other*

=> the themes here are: How did the concept of theory in physics shape early attempts to define theoretical biology and what has changes today, now that biology has replaced physics as the Leitwissenschaft of the 21st century?

May 22 pm: Epistemological and methodological foundations of biology in historical perspective (John Beatty, Rick Creath, Werner Callebaut)

*** this session is devoted to the changing epistemological foundation of biology in the 20th century with special emphasis on the role of theory in this context. In other words, in what way and how was biology guided by theory, how did this change over the 20th century, and where might we be today.*

=> the themes here are: How did the status of theory change within biology and between different biological disciplines and how are these changes connected to larger philosophical and methodological shifts and what role did the field of philosophy of biology play in the second half of the 20th century

May 23 am: The expansion and fragmentation of biological concepts, theories and epistemologies in the 20th century (Mike Dietrich, EFK, and ML)

•• this session will discuss the process of expansion and fragmentation/specialization of the biological sciences in the 20th century and how in the course of this process the idea of a unified general or theoretical biology was transformed into multiple theories and models specific to each discipline.

=> the themes include: What has historically been the relationship between a “theoretical biology” and the diversity of theories and models in individual disciplines? How did these developments contribute to a shift in the meaning of theoretical biology?

May 23 pm: short presentations by participants; mid week summary by JC

May 24: Day off

May 25 am: Attempts to integrate and synthesize the biological sciences in the 20th century (Betty Smocovitis, JC, and David Krakauer)

*** this session is devoted to the history of attempts to provide a theoretical synthesis of what has been perceived to be the fragmented state of the biological sciences. Such areas include evolutionary biology, population biology, ecosystems ecology neurobiology and computer science inspired approaches*

=> the themes include: What types of syntheses have been proposed throughout the 20th century and in what way did these attempts reflect ideas about the role of theory in biology?

May 25 pm: The role of theory in 21st century biology, conceptual issues (EFK, JC, DK, Rob Page)

*** this session is devoted to looking forward into the 21st century and ask what role a conceptually coherent theoretical framework can play in the development of the life sciences over the next decade(s).*

=> *the themes include: What would a conceptual framework for the current life sciences look like? How can we shift the underlying structure (including the organizational, educational and funding structure) of the life sciences to accomplish such a goal? Is a universal “systems biology” the answer?*

May 26 am: Can history be a guide to organize 21st century biology (ML, EFK, Paul Farber, JM)

*** this final session will reflect on this week of discussion and ask what, if anything, can we learn from history in addressing the challenges of 21st century theoretical biology.*

=> *the themes include the question of the relationship of history of biology with biology (and philosophy of biology) in both research and education.*

May 26 pm: Summary and Final discussion

May 26 evening: 6:30 Seafood Dinner in the Migs Dining Room

For the sessions, where there are several of you listed, you can count on a 3 hour sessions (spread over 2 ½ hours with a half hour break). We leave it up to you how you want to divide your session. This is tentative, and we welcome suggestions.

We ask that you each provide not more than 25-30 pages of reading for each session that you expect everyone to have read and to be prepared to discuss, and you can add other materials as background. Ideally, you will provide us with electronic versions that we can post on our password-protected (and therefore legal) website for all participants to access.