

Future of Biotechnology

Pre-syllabus

P Bishop, 7/3/12

Introduction

I've called this document a "pre-syllabus" because I'm still feeling my way into this course. I typically begin a new course with the statement that "new courses emphasize enthusiasm over experience!" Well, I'm enthusiastic (and I hope you are, too), but not yet experienced.

I'm patterning this course after the only other special topics course I've taught in futures – Our Future in Space – that I thought off and on at Clear Lake. The difference is that I had a background in the space program (to some extent) through work I had done in space commercialization with NASA in the 1980s. While I still learned a lot in the course, I had some background to start with.

This case is different because, though I keep up with biotechnological developments as much as other futurists, I do not have any explicit background in the subject. So we will all be learning more as a group than as a teacher and a class. That's fine. Most of the people in the course are veterans—certainly as students and many as futures students so we've got the drill down.

The overall objective of the course, as it was with the Space course, is to create images of the future of this domain (biotechnology) grounded in solid evidence and reasoning plus a good dose of well-reasoned, yet imaginative speculation. As with all futures work, we want to expand people's awareness (and our own in this case) of the plausible futures that could happen.

Fundamentally the backbone of the course will be a set of books that we will read, discuss and use as the basis of the products we develop. Given the developments in biotechnology over the last few decades, the literature in this area is vast. So there is no way we can read it all. But since we are starting out, books are probably the best entry into the field, even though some may be outdated almost as fast as they are published. We'll then supplement that reading with articles and scanning hits that we will find along the way.

The books and topics that I have discovered so far are –

Overall topic	Recommended book(s)	Brief description
Basic science of biotechnology	<i>An Introduction to Genetic Engineering</i> , Nicholl	Basic biology
The history of biotechnology	<i>From Alchemy to IPO</i> , Robbins <i>Billion Dollar Molecule</i> , Werth	History of biotech industry Case study of drug creation

Overall topic	Recommended book(s)	Brief description
One specific domain – stem cells and anti-aging research	<i>The Immortal Cell</i> , West	Development of embryonic stem cells
	<i>Merchants of Immortality</i> , Hall	Critique of anti-aging research
An overall forecast of medical developments	<i>Redesigning Humans</i> , Stock	Medical advances
The transhumanist perspective	<i>More Than Human</i> , Naam	Transhuman developments
	<i>Rapture</i> , Alexander	History and cultural context of Transhumanists/bioutopians
Ethical dilemmas	<i>Made not Born</i> , Walker	Readings on ethics and critiques
Agricultural and industrial applications	<i>No book yet</i>	
Use in environmental applications	<i>Nature's Operating Instructions</i> , Ausubel	Readings on environmentally sensitive biotech

Each section should take about two weeks. Some topics have one book which we will all read. Some have two, in which case I will randomly assign half the class to read one or the other, but of course you can read both if you wish. And if you have or know of another good book on that topic, please suggest it and we might add it to the list. We are trying to use fact-based, futures-oriented, balanced treatments of the subject

The weekly (or bi-weekly) activities will include things like –

1. A report on your reading –
 - a. What you learned
 - b. What you disagreed with
 - c. What questions you still have
 - d. Implications of all this for the future
2. Internet search – other books, articles, experts, organizations and websites on the topic

There will also be three term products, based on a sub-domain of biotechnology chosen by the student –

1. A scanning journal containing at least 10 events or new pieces of information that appeared in that sub-domain during the semester.
2. A framework document containing the raw information one would use to create a forecast in the sub-domain. (*I'll teach what a framework document is for those that have not had that in the curriculum yet.*)
3. A magazine article containing an interesting and well-supported forecast of some aspect of the sub-domain.

We will develop these products using periodic milestones so that all the work does not pile up at the end.

Books

So everyone is going to read Nicholl, Stock, Walker (selections) and Ausubel. On the random assignment, get the books marked with an X in your row.

	Robbins	Werth	West	Hall	Naam	Alexander
Brown	X		X		X	
Carpenter	X			X		X
Desai		X	X		X	
Ellis		X	X			X
Lee	X			X		X
Newton	X			X	X	
Niles		X		X	X	
Ramirez		X	X		X	
Siko	X		X			X
Walsh		X		X		X

And if you know of better ones for any topic, please suggest it.

Schedule

Here is a tentative schedule although I expect it will change some, particularly since it goes one week too long! I'll have to take a look at the books themselves and turn one of these, at least, into a one-week unit.

Class date	Overall topic	Recommended book (s)	Brief description
Aug 24	Intro to the course		
Aug 31	Basic science of biotechnology I	<i>An Introduction to Genetic Engineering</i> , Nicholl, Part I	Basic biology
Sep 7	Basic science of biotechnology II	<i>An Introduction to Genetic Engineering</i> , Nicholl, Part II	Basic biology
Sep 14	Discussion of framework topics		Submit description of framework
Sep 21	The history of biotechnology	<i>From Alchemy to IPO</i> , Robbins <i>Billion Dollar Molecule</i> , Werth	History of biotech industry Case study of drug creation

Class date	Overall topic	Recommended book (s)	Brief description
Sep 28	No class		
Oct 5	One specific domain – stem cells and anti-aging research	<i>The Immortal Cell</i> , West <i>Merchants of Immortality</i> , Hall	Development of embryonic stem cells Critique of anti-aging research
Oct 12	No class		
Oct 19	No class		Submit current conditions in framework domain
Oct 26	An overall forecast of medical developments Discussion of baseline	<i>Redesigning Humans</i> , Stock	Medical advances Submit trends, plans and baseline forecast in framework domain
Nov 2	The transhumanist perspective	<i>More Than Human</i> , Naam <i>Rapture</i> , Alexander	Transhuman developments History and cultural context of Transhumanists/bioutopians
Nov 9	Ethical dilemmas	<i>Made not Born</i> , Walker	Readings on ethics and critiques
Nov 16	No class		Submit events, issues, ideas and one elaborated scenario in framework
Nov 23	Thanksgiving		
Nov 30	Agricultural and industrial applications Discussion of scenarios	Posted reports	Submit scanning journal (10 hits) from the domain since August
Dec 7	Use in environmental applications Final discussion of domains	<i>Nature's Operating Instructions</i> , Ausubel	Readings on environmentally sensitive biotech Submit draft portfolio – • Reading summaries • Scanning journal • Draft framework
Dec 14	No class		Submit final portfolio

Conclusion

So here we go. I'll send this out to the email list and post it on the website until I get all the Clear Lake people on the website. I'll construct the pieces of the website this week. It will be quite sparse compared to other courses since it's primarily reading and discussion.

But call or email if you have any questions...

