Supplementary Materials for

Interdisciplinary Graduate Training in Teaching Labs

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Supplementary Online Material

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Table S1. 2011 Physiology Alumni Poll of Students and TA's

TOTAL INVITED (2004 through 2010)	363		
Completed	177	49% of 363	("65% of 271 ""good"" addresses")
Partial	9		
Hard Bounce	81		
Soft Bounce	11		
Not responded	85		

1. What year did you attend the Physiology Course at MBL? (If you participated more than one year, check all that apply.)		
2004 or 2005	38	21%
2006	31	18%
2007	33	19%
2008	43	24%
2009 or 2010	66	37%

2. What was your career stage at the time you participated in the Physiology Course? (If you participated more than once, choose the career stage for the first year of participation.)		
Undergraduate	1	1%
Graduate student	119	67%
Postdoc	47	27%
Faculty	6	3%
Staff Scientist	3	2%
Mssing	1	1%
Total	177	100%

3. What is your current position?		
Graduate student	46	26%
Postdoc	74	42%
Academic faculty (research and/or teaching)	44	25%
Scientist in industry or government	5	3%
Science journalist	2	1%
Medical student	2	1%
"Other, please specify"	3	2%
Total	177	100%

4. How would you describe your primary background/training when entering the course?		
Biology	91	51%
Physics	46	26%
Chemistry	10	6%
Biochemistry or Biophysics	6	3%
Computation	11	6%
Engineering	9	5%
Mathematics	2	1%
Medicine	1	1%
Missing	1	1%
Total	177	100%

5. How likely are you to recommend the physiology course to a colleague?		
I have already recommended it to one or more colleagues	153	86%
Very likely	17	10%
Likely	4	2%
Not very likely	1	1%
Not likely at all	1	1%
Missing	1	1%
Total	177	100%

6. The Physiology Course's interdisciplinary exposure/training proved valuable for my subsequent research (interdisciplinary defined as mixing biology, computation, physics). (1 missing)		
Strongly Disagree	2	1%
Disagree	1	1%
Neutral	9	5%
Agree	58	33%
Strongly Agree	106	60%
Total	176	99%
Mean 4.51; Standard Deviation 0.73; Standard Error 0.05; Confidence Interval (95%) [4.40 - 4.61]		

7. If applicable, provide comments/examples for how the interdisciplinary exposure/training proved valuable for your subsequent research (88 Responses: Some fit more than one code)	
Shifted/ shaped thinking about/ direction/ quality of future research/ teaching/career	35
Exposure/training in new and valuable methods/topics/organisms/software	30
Assisted with/encouraged collaboration and interdisciplinary dialogue/research	23
Learned new and valuable way to think about questions/problems.	8
Made important contacts for career/scientific success	6
"Project started/skills obtained as student, continued/now published"	6
Built confidence in abilities and enthusiasm for biology/new methods/techniques	5
Provided wider view of biosciences	3
Expanded applications for current work	2
Impetus for future studies/work	2

Representative quotes:
"I am now much more likely to try new experiments even though they seem nearly impossible. This attitude has a very positive influence on the fun I have being a scientist, which is also reflected in the results."
The skills I acquired at the Woods Hole completely changed my worldview of science and also have significantly improved quality of my research (computationally).
"My research focus completely changed. I was theory/simulation oriented. I moved to do a postdoc in a field where I obtain my own experimental data (EM), and write quantitative software that is needed to analyze large and noisy datasets. I would never go back!"
"The course led me to rethink several projects I wanted to pursue with my new laboroatory. For example, C. elegans now turns out to be the ideal model system for some of our work. Without the experience from the physiology course, I never would have pursued this direction."

8. The laboratory provided a more important setting for training than the lectures. (1 missing)		
Strongly Disagree	0	0%
Disagree	12	7%
Neutral	41	23%
Agree	80	45%
Strongly Agree	43	24%
Total	176	99%
Mean 3.88; Standard Deviation 0.86; Standard Error 0.06; Confidence Interval (95%) [3.75 - 4.00]		

9. I found the research questions that I worked on during the course to be interesting and stimulating. (3 missing)		
Strongly Disagree	1	1%
Disagree	2	1%
Neutral	3	2%
Agree	76	43%
Strongly Agree	92	52%
Total	174	98%
Mean 4.47; Standard Deviation 0.65; Standard Error 0.05; Confidence Interval (95%) [4.37 - 4.57]		

10. My perception of success in course projects was associated with overcoming barriers and making progress, rather than obtaining a publishable result. (1 missing)		
Strongly Disagree	1	1%
Disagree	2	1%
Neutral	9	5%
Agree	64	36%
Strongly Agree	100	56%
Total	176	99%
Mean 4.48; Standard Deviation 0.7; Standard Error 0.05; Confidence Interval (95%) [4.37 - 4.58]		

11. The focus on hard work, cooperation and brainstorming provided by the research component of the course proved valuable when I re-engaged with my own thesis or postdoctoral project. (3 missing)		
Strongly Disagree	1	1%
Disagree	1	1%
Neutral	20	11%
Agree	64	36%
Strongly Agree	88	50%
Total	174	98%
Mean 4.36; Standard Deviation 0.75; Standard Error 0.06; Confidence Interval (95%) [4.25 - 4.47]		

12. Peer-to-peer teaching was important for interdisciplinary training. (2 missing)		
Strongly Disagree	1	1%
Disagree	1	1%
Neutral	5	3%
Agree	51	29%
Strongly Agree	117	67%
Total	175	100%
Mean 4.61; Standard Deviation 0.63; Standard Error 0.05; Confidence Interval (95%) [4.52 - 4.71]		

13. The Physiology Course proved valuable for me to think about and engage in research outside of my "comfort zone" (e.g., physical sciences/computation for biologist; experimental biology for physicists/computational scientists) . (3 missing)		
Strongly Disagree	1	1%
Disagree	3	2%
Neutral	15	8%
Agree	55	31%
Strongly Agree	100	56%
Total	174	98%
Mean 4.44; Standard Deviation 0.77; Standard Error 0.06; Confidence Interval (95%) [4.32 - 4.55]		

14. If applicable, provide comments/examples for how the course proved valuable for you to think about and engage in research outside of your "comfort zone." (63 responses; some fit more than one code)	
Expanded applications for current work	30
Assisted with/encouraged collaboration and interdisciplinary dialogue/research	17
Shifted/shaped thinking about/ direction/ quality of future research/teaching/career	9
Built confidence in abilities and enthusiasm for biology/new methods/techniques	8
Impetus for future studies/work	7
Learned new and valuable way to think about questions/problems/biology/science	7

Representative quotes:
"Prior to the Physiology Course I was used to thinking only about traditional cellular biology. After the course, I was much better equipped to engage with the students and faculty around me whose research was on wildly different subjects. Some of this was the background in other disciplines that the Physiology Course provides. However the Physiology Course's true power is in providing students with faculty, technical staff, and course directors who are completely open to being engaged in discussion. This provides an atmosphere of collegiality which extends far beyond the bounds of the course itself, fostering an attitude of open discourse with all."
"Prior to coming to MBL I had never even heard of Matlab. I now I have it on my computer in order to try to learn how to write code and do some basic mathematical modelling. I have also purchased physics for biologists books and systems biology books, which I would have never known about or knew to purchase before MBL. It was truly one of the best intellectual experiences of my scientific career thus far to be exposed to so many different ways of thinking about and approaching science. Awesome."

15. The Physiology Course made me more aware of and willing to learn new techniques. (2 missing)		
Strongly Disagree	1	1%
Disagree	1	1%
Neutral	14	8%
Agree	53	30%
Strongly Agree	106	60%
Total	175	99%
Mean 4.5; Standard Deviation 0.72; Standard Error 0.05; Confidence Interval (95%) [4.39 - 4.60]		

16. If applicable, provide comments/examples for for how the course made you more aware of and willing to try new techniques. (55 responses; Some fit more than one code)	
Exposure/training in new and valuable methods/topics/organisms/software/equipment	37
Built confidence in abilities and enthusiasm for biology/new methods/techniques	15
Shifted/shaped thinking about/direction/quality of future research/teaching/career	6
Assisted with/encouraged collaboration and interdisciplinary dialogue/research	4
Learned new and valuable way to think about questions/problems/biology/science	3
Impetus for future studies/work	1

Representative quotes:
"One message I took home from WH is: be fearless! This goes both into trying new techniques, asking simple questions to get into a field quicker, etc. A specific example is, I do experimental work outside of my comfort zone almost every day now, and I understand much better what my collaborators are doing by joining them in the lab sometimes. Although sometimes scary, it's rewarding and leads to wonderful results."
"It made me just get out there and try whatever technique was the best. I now avoid being timid and just go for the technique that will fit the bill. I am not afraid of science and the Phys course really helped me with this. Also I have lost my intimidation of other scientists."
"My knowledge of microscopy was quite slim, and obtained in the era before automated image acquisition and -processing. These projects gave me the confidence to build my lab largely on quantitative microscopy."

17. The collaborative nature of course projects positively influenced my attitude towards engaging in collaborative experiments in my subsequent work. (2 missing)		
Strongly Disagree	1	1%
Disagree	1	1%
Neutral	20	11%
Agree	73	41%
Strongly Agree	80	45%
Total	175	99%
Mean 4.31; Standard Deviation 0.74; Standard Error 0.06; Confidence Interval (95%) [4.20 - 4.42]		

18. If applicable, provide some comments/examples of how the collaborative nature of course projects positively influenced your attitude towards engaging in collaborative experiments in your subsequent work. (55 responses; Some fit more than one code)	
Provided positive collaboration/ interdisciplinary research experience	26
Now strive for collaboration in current work/research	13
Showed value of scientific collaboration/ interdisciplinary research	12
Miscellaneous	6
Continued collaborations forged during course	5
Impetus for future work/research	5
Course modeled high-quality collaboration	3

Representative quotes:
I was very positively impressed by the fact of the existence of the course. World-class researchers go every summer to teach this course to graduate students and postdocs from around the world. Many of the collaborations forged there are continued after the end of the course. I had never really seen a model like that for scientific research. It is a very idealistic model that puts the research above all other considerations. I strive to work in this collaborative manor in my research now.
I was impressed by the interplay between theoretical modeling and experiments in Prof. van Oudernaarden's project: this showed me that a productive combination of experiments and models is possible and can be more useful than either experiments or models taken on their own.
"I now have renewed sense of faith in the collaborative nature of science. The goodwill of everyone attending the course, and their desire to teach and learn from one another was truly inspiring."

19. Looking both back and forwards, the Physiology Course was an important step in my career as a scientist. (5 missing)		
Strongly Disagree	1	1%
Disagree	3	2%
Neutral	10	6%
Agree	43	24%
Strongly Agree	115	65%
Total	172	97%
Mean 4.56; Standard Deviation 0.74; Standard Error 0.06; Confidence Interval (95%) [4.45 - 4.67]		

20. If applicable, provide some comments/examples for how the Physiology Course was an important step in your career as a scientist. 64 responses (Some fit more than one code)	
Shifted/shaped thinking about/direction/ quality of future research/teaching/career	21
Exposure/interaction with leading scientists	20
Made important contacts for career/scientific success	19v
Built confidence in abilities and enthusiasm for biology/new methods/techniques	16
Learned new and valuable way to think about questions/problems/biology/science	9
Assisted with/encouraged collaboration and interdisciplinary dialogue/research	5
Provided positive collaboration/ interdisciplinary research experience	4
Continued collaborations forged during course	3
Showed value of scientific collaboration/interdisciplinary research	3
Positively impacted jobs offered	2
Significant and varied teaching experience	2
Expanded applications for current work	1
Miscellaneous	1

Table S2. PHY ALUMNI SURVEY RESPONSE DETAILS (questions 7, 14, 16, 18, 20, 22, 23, 24, 25)

7. If applicable, provide comments/examples for how the interdisciplinary exposure/training proved valuable for your subsequent research	
Respondent #	**Response**
1	Learned to work with different organisms -Learned to formulate important questions in life science -Made very important contacts for my career
2	I learned things about biosciences that can only be learned through exposure in an intensive lab environment.
3	Learnt 'bio-speak'. Learnt about how biologists think about questions and problems.
4	I am no longer scared/confused by biology experiments and publications.
5	Microscopy training was invaluable, exposure to breadth of topics very useful
6	I was exposed to a new community of researchers that caused me to completely switch research directions, choose a different postdoc advisor and identify a new area of research for my laboratory.
7	The skills I acquired at the Woods Hole completely changed my worldview of science and also have significantly improved quality of my research (computationally).
8	I have used many of the computational techniques that I learned in the course in my own research.
9	published a manuscript in JCB within 1.5 years following the courses completion and based on the project that was begun in the course
10	I am now much more likely to try new experiments even though they seem nearly impossible. This attitude has a very positive influence on the fun I have being a scientist, which is also reflected in the results.
11	I learned a lot about microscopy and mathematical modeling that I would not have been able to obtain at my institution. From this course I was able to start a collaboration to use mathematical modeling in the research for my thesis.
12	I utilize the knowledge and techniques I learned in the lab right now. Some of the future research ideas are inspired by the talks and discussion I had during the course.
13	As a physisist, the physiology course help me to set up experiments with my collaborators to validate my models.
14	The training proved invaluable in explaining my work in concrete-mathematical terms to other scientists on my team with computational backgrounds.
15	After participating in the course, I delved into computational image analysis, for which the training and thinking provided in Woods Hole proved very valuable. Also, the contacts made during that time and the subsequent interaction with people I met in Woods Hole were critical to my further scientific progress and success.
16	It made me more aware of how as we progress in our knowledge base , the new and cutting edge is at the crossroads of disciplines. So while I am not skilled in physics and computation, I now know people who are, and know the value of setting up collaborations to bring disciplines together. For example, I came back from the course and with the help of another graduate student, set up a collaboration with a computational lab to analyze our microscopy data. Through this we have been able to pull much more information than we could have scoring by eye.
17	In the course, we learned Bessel Beam microscope which is a new high resolution 4D imaging technique. This exposure led to a colaboration between our lab and the Bessel Beam Lab in Jenalia Farm, HHMI.
18	It was great to look at research projects from different 'angles'.
19	It allows me to think past my particular speciality when problem solving.

20	As a mathematician, I had come across many publications that presented mathematical models of biological theories. I knew that such models should be based on biological evidence. The Course allowed me to distinguish between models that were based on solid biological evidence (and occasionally on the quality of the biological data presented) and models that were based on the modeler's perception of a biological phenomenon. I realized the vast difference in the quality of a mathematical model that is based on good data. After the course, I was able to make new collaborations with experimental teams (currently with researchers at the Institute for Cell Biology and Neuroscience in Goethe University in Germany). Last, but not least, during the Physiology course I fell in love with the experimental part of biology. Since then I have been trying to set up a laboratory at my University, where I plan to redo some of the experiments I did during the course and extend them, in the hope to seek answers to my questions.
21	Exposure to many different types of thinking helped shaped my own views of how biology works and what are the many different approaches one could use to study it.
22	I use simulation techniques that I was first exposed to in the course. More generally, the course fosters a broad, ""big-questions"" approach to science and encourages trying experimental techniques outside one's comfort zone.
23	The course helped me decided to pursue postdoctoral training in developmental biology.
24	The most important thing I got out of the course was in meeting people and making scientific contacts for future work. It was not the training as much as being present in that environment.
25	I learned how to do modeling by matlab and built a model for my own research on regulation of microtubule dynamics by depolymerases during the course
26	This year we had one student with an applied math background make a significant contribution to our analysis program.
27	I now routinely use computational image analysis as a part of my research project. Before taking this course, I had no exposure or training on how to integrate the two areas. I also have a much better understanding of computational, modeling or theory-based literature. It is my goal to keep pursuing quantitative biology as we learned in Woods Hole.
28	The introduction and emphasis on quantitative biology has pervaded our research. Most of my students are now trained in physics/chemistry/biology. And I foresee that they have become 'converts' and will train their students....
29	It provided a greater exposure to computational analysis, particularly MatLab. I now use MatLab in my analysis of post-synaptic morphology and signaling.
30	I would have said Strongly Agree except that I already had a lot of interdisciplinary experience (ie experimental biology and computational biology) so it was not the course that initiated this but the course did help solidify the fact that I want to teach interdisciplinary biology
31	I have not directly worked in the area opened by the course, but the course definitely broadened my horizon and I would like to do some follow-up work if the chance arises.
32	I learned enough code to write a small program that I published with!
33	I got much feedback from the physicists' perspective about my project. My computational skills were also improved a lot.
34	I did computational work (matlab) when I got back to my lab.
35	I wanted to switch from Physics (as a graduate student) to Biology (for my postdoc). In the course I learned that this is possible. I got a good introduction to microscopy and lab work and had the chance to try different projects and model systems.
36	acquisition of acute knowledge of most of the new microscopy technologies and their theoretical bases. -getting some basics in coding (matlab) that allowed me to go further -establishment of long-lasting professional relationships with scientist in other disciplines I am getting advice and help from that benefit my research.

37	My research focus completely changed. I was theory/simulation oriented. I moved to do a postdoc in a field where I obtain my own experimental data (EM), and write quantitative software that is needed to analyze large and noisy datasets. I would never go back!
38	I used new microscopy methods and got exposure, directly or indirectly, to many interesting biological systems, which have influenced the course of my research.
39	When I started participating in the course I was set on doing a postdoc developing computational models of protein folding. Being exposed to the wide variety of quantitative experimental biology made me realize that there were exciting ways to measure biological phenomena that could take advantage of my physics background. I completely changed my research outlook, did an experimental postdoc and could not be happier.
40	Have since published papers with computational approach associated.
41	I found that modeling (computer) was much nore enlightening that I thought it would be.
42	I am a biology grad student and I currently use MatLab and some tracking software from the Danuser lab that I was taught to use at the MBL in my thesis work.
43	As I ventured from engineering to biology/engineering, the training helped me understand how molecular biologists think about problems, and provided a knowledge of the currently available tools.
44	The course led me to rethink several projects I wanted to pursue with my new laboroatory. For example, C. elegans now turns out to be the ideal model system for some of our work. Without the experience from the physiology course, I never would have pursued this direction.
45	I understood the importance of interdisciplinary research and the productivity that results from it. I, as a biologist without any computational training, was encouraged to collaborate with computer scientist and was even able to apply simple programming that I learned in the course, to my research at home.
46	As a TA it was less about exposure to more hand-on biology and more about discussions of further applications for the modeling I was already doing.
47	Familiarized me with areas of biology in which physical scientists are interested opening up collaborations. Also familiarized me with relatively user friendly software for computational approaches eg Berkeley Madonna and Matlab.
48	One of the projects that I worked on at the physiology course was continued after the course and is now a paper that has been submitted for publication. Through this work, I gained experience in working in bacteria, working with lipids, and learned how to do western blots, three skills that I otherwise wouldn't have had the opportunity to develop.
49	improved my ability in programmming.
50	As an introduction to biology, the course provided me with interest and foundational techniques that allowed me to pursue an interdisciplinary career. I am currently the only physicist working in a lab of biologists, and the contrast I provide has been very productive. This would not have been possible without the MBL Physiology course.
51	It led me to join an interdisciplinary lab for my PhD thesis research and has greatly influenced/changed my scientific thinking/approaches.
52	As a result of the physiology course, I was inspired to combine my computational work with experiments.
53	The initial boot camp provided a valuable overview of methods for the quantitative analysis of microscopy images, and the subsequent projects gave me a chance to implement and practice what I learned. The exposure to top of the line imaging techniques from Nikon and Zeiss that I got during the course also translated well to my subsequent work, which covered several microscopy techniques. The lectures and Q&A sessions with lecturers helped to broaden my understanding of modern cell biology and exposed me to topics I hadn't encountered before. Lastly, the community of motivated and brilliant researchers associated with the course is a unique and immensely valuable resource for my career overall.
54	I subsequently combined computation with biochemistry in collaboration with physicists for enzyme kinetics studies.
55	I find the techniques I learned in the course have been invaluable in how approach my research.
56	I completed my PhD in computer science; I am now working on fusion proteins in a wetlab. I had no prior experience in wetlab biology. I am attempting to draw on both backgrounds for simulation of my system now.

57	As a biologist, I am doing modeling myself!
58	Learning about the current methodologies for integrating quantitative and biological experimentation to approach mechanobiological questions helped me formulate my next planned projects as a postdoc and beyond.
59	built collaborations
60	I saw live cell imaging of transfected cells was a mature technique - perhaps too mature. The quality of the questions matters, not so much the nano-details of the protein pathway. Anybody and their mother can track fluorescent fusions now-a-days. Exposure to and training in state of the art techniques (confocal microscopy, particle tracking, RNAi, DNA sequecning, PALM, AFM, etc) were extremely valuable in lowering the threshold to using some of these methods in my own lab. Again, using technology is not so much an advantage as finding good questions and problems.
61	After WoodsHole Physiology in my PhD thesis besides of the lab experiment I am using modeling in some parts of the project. Besides the course imprinted in me a spirit of collaboration which I am applying by working together with my scientific friends from other labs in Mexico to generate new ideas and work in new projects; this sort of collaboration unfortunately is not so common in my country, so I call it ""Woods Hole Physiology Spirit"".
62	As a first year TA I made contacts that have turned into fruitful calibrations. Thud exposure to engineers and physicist (both students and TAs) was particular useful since they brought.a different way of thinking about biological problems, some of which I have been thinking about myself for a decade now.
63	This course helps broaden my view in biology.
64	My entire research program as a faculty member relies heavily on ideas and skills I learned in the physio course. Were it not for this course, I would not be doing the research I am doing today.
65	The combined approach of microbiology, microscopy and modelling is exactly what I use in my own lab now, and demonstrating that we had done this in a course project helped to get me the position. While I had experience with both modelling and labwork beforehand, this was my first exposure to the experimental techniques needed to study the system I was modelling. This was invaluable for getting a better understanding of the relevant papers, and is now invaluable for doing similar experiments in my own lab.
66	It improved my communication with colleagues with different background.
67	Microscopy and MATLAB have been indispensable tools in my research arsenal.
68	I learned a good deal about microscopy at the course, as well as met a number of terrific researchers.
69	Meeting colleagues and professors, learning about computational approaches to cell biology, having students of varied backgrounds working on projects of my devising yielded unexpected and exciting results that I might not have come to myself.
70	I established collaborations that were pursued after being at the MBL.
71	coming from a biophysics lab, we established a very fruitfell collaboration with a biochemistray lab. - Before the course I did not really know biology and basically wanted to do physics on biologocal material. After the course I got more and more interested in real biology. And currently I am doig my post-doc in a real biology lab.
72	new microscopy techniques, mammalian cell culture, new biochemical techniques
73	My biophysics research was aided by learning the logic of biochemical protocols. Also, the broad exposure to different topics helped my understanding of the wider implications that parts of my research could have for the biology community.
74	Participation in the Physiology course as a student was instrumental in the development of a project which then went on to become an important component of my Ph.D. thesis.
75	As far as interdisciplinary is concerned, probably most valuable was the varied background of the students and faculty - it was very easy to get the right mix of skills to tackle interdisciplinary problems at the course, as well as see how leaders in the field tackle interdisciplinary training.

76	As a physicist, I chose a cellbio lab for my postdoc to stimulate crosstalk with biologist. This was very fruitful. - I started project that combined live-cell imaging, molecular engineering and modeling
77	it was the reason I went to ucsf for graduate school. I went to work with Dyche Mullins.
78	It gave me the confidence to approach biological questions and opened up whole new areas to me.
79	I have used computation along with imaging ever since.
80	Some of the microscopy I learned was useful while I finished my Ph.D. I am currently using some of the data analysis and computational modeling thatI learned at the physiology course to improve my postdoc research.
81	I utilized the two day section on Matlab training to write image analysis scripts that I utilized in both of my manuscripts as a graduate student.
82	I was exposed to many ideas and met many prominent scientists. I felt the excitement in the field. Both the lectures and lab experience were fantastic.
83	The microscopy training was the very helpful for my subsequent research
84	My research attempts to answer fundamental biology questions using the tools and concepts of Soft Matter Physics. Exposure to biology and the ways in which people have been successful in solving biology problems using interdisciplinary approaches was an extremely valuable and inspiring experience.
85	I recently published a paper from my lab (now as faculty) with two physiology students as co-authors. They provided essential computational approaches for our work.
86	To see how the strengths of microscopy could be brought to bear on cells and tissues, in ways the manufacturers had not even anticipated, turned everything on its head. To see biology not being limited by tools, but actively pushing the envelope, is something that has influenced how I work today.
87	I attended as a TA. I'm sure the students benefited from the exposure, but I didn't experience the full course as I was in teaching mode
88	My background was biology but my dissertation research focused on biophysical questions. The course gave me the context necessary to address these questions, as well as practical tools to deal with my data analysis (exposure to software, etc.)

14. If applicable, provide comments/examples for how the course proved valuable for you to think about and engage in research outside of your ""comfort zone."	
Res-pondent #	**Response**
1	showed it is not that hard to work with other systems. - Many concepts that I had from my physics background were applicable to different biological systems
2	his was my first experience with biology research. I am now an experimental biophysicist. Without the experience that I gained in the physiology course I don't think I would have had the confidence or the information to pursue this career path.
3	See and participate in a lab environment helped me to understand why experimental data in published papers is often so messy, and why results from different groups often contradict.
4	It's difficult already to learn all the biology related to my project. Without the course, I would have never had a reason to learn about other aspects of cell biology.
5	I had a background in computation and decided to do an ""experimental"" post-doc based largely on the experience in the course.
6	Interacting in a supportive environment with people from such different backgrounds helped me feel comfortable asking questions about basic techniques, general ideas that I had not felt comfortable doing before.

7	As a biologist I was engaged in questions that were involving physics and computations
8	All of the Woods Hole research projects used techniques that I was not familiar with, either for experimentation or for data analysis.
9	I am now able to write and read computer code and in addition apply the skills I've learned to my own research thesis. No one else in my laboratory has these skills.
10	As a theoretical physisict I had to set up and perform experiments> I would not say I enjoyed it but it was very valuable to understand and improve the system I was trying to model.
11	Prior to the Physiology Course I was used to thinking only about traditional cellular biology. After the course, I was much better equipped to engage with the students and faculty around me whose research was on wildly different subjects. Some of this was the background in other disciplines that the Physiology Course provides. However the Physiology Course's true power is in providing students with faculty, technical staff, and course directors who are completely open to being engaged in discussion. This provides an atmosphere of collegiality which extends far beyond the bounds of the course itself, fostering an attitude of open discourse with all.
12	Interacting with people from different backgrounds and finding a common language to talk a about a scientific problem or also look at it from new perspectives and angles is something that the strong interdisciplinary character and collaborative atmosphere at the Physiology Course nurtures and fosters.
13	I picked neutral above because personally when I left the course, I left with a better understanding of how to put disciplines together, and not leaving with an ability to engage in work in a different discipline myself. On more than one occasion for the sake of progress it felt as though students of the course were encouraged to play to their strong suit in the laboratory setting and I know certainly of one computational person my year that was upset at being typecast and didn't get to do as much wet lab work as they wanted. Having no previous programming skills left me in a boat where I could only understand what could be done by others, as a 2 day primer was not enough to get me up and running with matlab.... but to answer the question I certainly thought about how to analyze my data in a way that I never had and engaged in conversations with fellow students that DID have a better grasp on these things than I.
14	I became much more willing to just try things without spending hours reading papers before being willing to dip my toe in. As a computational person, I did have a bit of lab experience from doing some experiments in our collaborator's lab, but it was valuable for me to see that there are many ways to do things other than the very careful approach they took. In that lab, I only followed their protocols, but in the course I got to think for myself about the experimental problems and realise that I had useful experimental insights.
15	I choose my postdoc in an area completely different from my comfort zone. Before being exposed to physiology course that would not be possible!
16	image analysis in general
17	Just knowing what other tools are available was helpful in getting out of my comfort zone. Exposure was a huge component to the course for me.
18	See answer in previous section (1-10).
19	Prior to coming to MBL I had never even heard of Matlab. I now I have it on my computer in order to try to learn how to write code and do some basic mathematical modelling. I have also purchased physics for biologists books and systems biology books, which I would have never known about or knew to purchase before MBL. It was truly one of the best intellectual experiences of my scientific career thus far to be exposed to so many different ways of thinking about and approaching science. Awesome.
20	One word: pipetting :) More seriously, the exposure to so microscopy was very important in my scientific development. More specifically, going over so many modes of microscopy from TIRF imaging of actin speckles to high throughput imaging of PKC translocation in such a short time helped me understand the pros and cons of each approach. Later I have used many of these techniques in my own research, probably not a coincident.

21	I promise I hadn't looked at this page when I was answering questions on the last page. I had no experience with microscopy or compter simulations before the course. The course prompted me to think about ways to do biophysics in cells, analyzing image data to get information such as physical constants, and to use computation as a way of interpreting the results. I currently use live-cell microscopy far more than any other experimental approach.
22	I was lucky to have both fields as comfort zones before the class but I definitely learned more about how pure biologists think, which was very helpful for later research.
23	Because of my experience in MBL, I want to incorporate modeling and computational analysis in my research as much as possible. Taking the course also provided me with a network of physicists who are willing to collaborate with biologists.
24	no longer intimidated (completely) by macros and matlab codes. have begun collaboration with physics lab.
25	I was daily challenged to think outside my comfort zone, whether modeling mitosis with Frank Julicher or learning the theory behind super-resolution PALM with Eric Betzig. Stepping outside my comfort zone broadened the horizon of techniques available for my own research.
26	Despite not necessarily using it in my own research I feel much more comfortable having a conversation with and engaging with scientists from other fields.
27	As explained in the previous part, I was a physicist. I knew almost no Biology and it was great to learn so much and get to work with ""live"" systems.
28	computation -contribute to my switching from ""classical"" developmental biology to systems biology-like postdoctoral projects
29	For one, I had to pick up a pipette! Everything was new to me, even the computational side, since I wasn't used to doing image processing.
30	I have since taken approaches outside of my comfort zone without being afraid.
31	I was confronted with MatLab work for the first time, found it very hard but I think it is a tool that every scientist should take advantage of.
32	I usually deal with building systems and things I can see. MBL helped me deal with the discomfort of trusting clear, colorless liquids.
33	Working together with scientist from different fields and getting to know their way of approaching scientific problems or questions, created an open-mindedness, that helps to see things in a more comprehensive way. In particular getting an insight into computer modeling as well as mathematics had a big impact on my research.
34	I realized that there were many questions I could approach either on my own or with a collaborator, who is an expert in the area outside my comfort zone, that would enrich my research by adding much more depth to the analysis or suggest new experimental directions.
35	As someone with a pure physics background, I learned how biologists and biochemists approach problems.
36	I joined a biophysics lab for my thesis research rather than a biochemistry one, as I had planned.
37	The course exposed me to a wide range of topics in cell biology and gave me the confidence to start doing experiments in my own work which had been previously entirely computational.
38	he physiology course was the first time I ventured to work on a multicellular organism! My project with Prof. Wieschaus on Drosophila embryos was a fun excursion outside my in vitro comfort zone.
39	I continued my PhD research in a more interdisciplinary way combining enzyme kinetics and optical microscopy. Ever since, all my projects involve a wide variety of approaches. I seek collaboration with experts outside of my "comfort zone"" and we also ""import"" some of these to the lab.
40	See question 7, but also I had an opportunity to see how techniques from computer science (my background) could actually be useful on a practical basis for biologists.
41	The most difficult part is to conceptually understand the logic in other disciplines. Physiology course provide a chance for one-on-one communication with professional people in other areas.

42	I was forced to work on biochemistry techniques which I was totally unfamiliar with, having come from a quantitative/imaging background.
43	It was these interactions that, I believe, benefited me the most. To be able to appreciate how others approach a similar question/problem proves invaluable in the thought process of the design of experiments
44	I learned more about MatLab coding than I ever expected, mostly by teaching others as a so-called ""expert"". With an established protocol, I feel reconstitution is not be feared. With attention to detail and good reagents, you can depend on the ""classics"" to work and still think of new experiments to do with them. Figuring out a reconstitution procedure (even a smal part), is enormously challenging and is not to be underestimated. Knowing the difference between the former and the latter is not as easy as one may think.
45	Well it made me move away from my comfort zone and re-Learn Math for Modeling. :)
46	I'm from computational physical science side, and in this course I was exposed to a lot of experimental biology. Of course I gained invaluable experience outside of my ""comfort zone"". This course greatly helped me when I want to expand my research area, and also helped communicate with other biologists, and set up potential collaborations.
47	I learned to purify and label protein, grow bacteria, and even take time-lapse movies of flies. My PhD was in theoretical physics.
48	With a Masters and PhD in Molecular Biology, and a Postdoc in Computational Biology, I had already embarked on an interdisciplinary path. (I was a TA at the MBL.) But these courses reinforced that I had made the right decision and gave me lots of ideas and insights that would have otherwise been hard to come by.
49	experimental biology
50	Essentially, the course establishes a new ""comfort zone"", one which more and more quantitative biologists occupy.
51	It broke down barriers in terms of techniques (especially imaging technologies) and made me ok with trying anything in the lab.
52	I carried away the attitude that there is a way to figure out how to do something new AND that there are always great people around that I do not hesitate to consult.
53	In the end the course was the first serious step for me from physics into biology ending in me going into a biology lab for my post-doc which turned out to be far out of my comfort zone. It is surprising how far the field of even single molecule biophysics and real biology are still apart.
54	It is reassuring to see how many questions in biology are not understood by even the most eminent researchers in the field, and to find out that even as an outsider I can have an intelligent conversation on these questions with my background.
55	Specially the computation part of the course was outside my comfort zone. I enjoyed it and I am in touch with the system biology research. I am very much interested in taking this approach when required.
56	As an engineer, I had not worked with C. Elegans. During my course, I participated in a project with Tony Hyman's group where I learnt to dissect C. Elegans. The course made me appreciate how little it takes to try something new and learn a lot, especially if one has a new idea or a novel approach that she/he is interested in moving in different direction.
57	cellular expts instead of in vitro
58	Some questions aren't really relevant as I was a TA in the class.
59	coming from a biology/chemistry background, it made me aware of the role that physics can play in biology and made me better able to communicate with physicists.
60	It motivated me to combine benchwork biology with my computational studies.
61	I had the time, available expertise and perfect project to learn computation. I'm not sure I could have experienced this elsewhere.
62	Prior to the course I had not developed any analysis tools, but now I develop nearly all of my own analysis tools, since most stock applications are not sophisticated enough to meet my needs.

63	ll foreign subjects seem strange and inaccessible at first glance. Taking the physiology course helped me realized that there was nothing mysterious about molecular biology. In short, it became ""real"" to me and thus accessible. I became fearless in tackling fundamental biology questions.

16. If applicable, provide comments/examples for for how the course made you more aware of and willing to try new techniques.	
Res-pondent #	**Response**
1	As I mentioned above, all the experimental techniques I learned in the course were new to me. I approached my postdoctoral position with a great deal of experience in time-lapse microscopy and fluorescence imaging and with a firm understanding of the pitfalls and experimental limitations of these techniques. I also networked with experts in imaging who I have maintained a close relationship with as I move forward in my research.
2	I learned to write a simulation and worked with live cells. Both of these are techniques I don't need with my current project. However, I did learn to work with the PolScope, which is proving to be a useful technique I am exploiting in my current research. Now, when I learn a new technique, I know which questions to ask to get the most out of training sessions.
3	Before I knew there is biology, physics or computer science. Now, I realize those fields are all intercalated and I would love to be more than just a biologist. I gained a lot of confidence and I believe it's possible to be interdisciplinary.
4	After an introduction during the course, I started learning MATLAB on my own and have since used it extensively in my research.
5	It certainly increased my awareness of other techniques and their pluses and minuses. I had never worked on a TIRF microscope, or worked with FRAP. Having a focused research project where I worked with these instruments for 2 weeks gave me a tactical understanding more than a lecture or demo would. As to willingness to try new things, the course more validated my own natural inclination.
6	Trying out different kinds of microscopes and just approaching a question, even very naively, is something that learned during the course and that I have applied since.
7	I had done a limited amount of cell culture work prior to the course and since have started a cell culture complement to my thesis work, and as I mentioned above we now collaborate with a computational lab on my campus to analyze data from this cell culture work.
8	I realised that learning new techniques is not really very difficult- previously I thought that trying any new technique would require a lot of time and training, but in the course I discovered that you can just try things. Matching questions and techniques is of course important, but simply learning techniques should not be an obstacle to research progress.
9	The combination of experimental data and modeling was interesting.
10	I became strongly committed to automated and quantitative image analysis and have used these techniques for several papers.
11	Ever since I finished my Ph.D. I wanted to engage in experimental biology but I didn't know how to. The course provided me with the first hands-on experience which turned what appeared (to a mathematician) as biological jargon (!) to a set of key words and techniques that could be learned. I finally knew where and how to look for the required details. I am planning to start my lab (in collaboration with a colleague that provided me with some space in their wet lab) in the next few months. As a faculty that visited the course told me ""one only has to try and redo the simpler of the experiments that appear in the papers - over and over again, until you get them right. Once you get the hang of it, you can make extensions of your own. Then design your own experiments."
12	See above.
13	I learned several new microscopy techniques and how they can be useful.

14	lectures that included uses for PALM and SIM, for instance, were valuable, showing many applications for the more cutting edge (and lesser used) microscopies
15	I was already very open-minded about new techniques. However, it added the new dimension of scripts/automated analysis to the picture and made me realize that there were other quantitative tools that I needed to explore.
16	As stated above, I tried using MatLab to write a code that would simulate mitosis.
17	I had no experience with live cell imaging and after the course I feel comfortable with doing cell imaging.
18	It made me just get out there and try whatever technique was the best. I now avoid being timid and just go for the technique that will fit the bill. I am not afraid of science and the Phys course really helped me with this. Also I have lost my intimidation of other scientists.
19	The projects and the way how other labs worked remind me of the importance of the super-high resolution imaging. I also learned much about single-particle tracking.
20	I learned how to use many kinds of microscopes. I tried different kinds of systems to work with (yeast, epithelial cells, frog oocyte extract). I tried new techniques for labeling and measuring activity in these systems. I learned how to analyze images in matlab.
21	Most importantly, I learned I was able to try any new technique if needed: nothing might be out of reach, if given the right support by experts when needed.
22	Often the biggest barrier to learning a new technique is trying it for the first time. The Physiology course helps break down this barrier by exposing students to a wide range of techniques, and encouraging them to keep expanding their tool kit after the course is over.
23	One message I took home from WH is: be fearless! This goes both into trying new techniques, asking simple questions to get into a field quicker, etc. A specific example is, I do experimental work outside of my comfort zone almost every day now, and I understand much better what my collaborators are doing by joining them in the lab sometimes. Although sometimes scary, it's rewarding and leads to wonderful results.
24	I was exposed to more microscopy than I knew existed.
25	I developed a general attitude to have courage to try new things, that might be far away from techniques that are established in my lab/institute.
26	Computational tools became more accessible, especially user friendly tools like Berkeley Madonna and Matlab.
27	Prior to the course, I had never used a confocal microscope, performed FRAP, or done extensive programming for image processing but as a result of the course, I'm comfortable now with these techniques.
28	It was the first time I had done any real biology.
29	It taught me the advantage of model-driven research.
30	Working closely with physicists broadened my view of what could be done with quantitative image analysis using MATLAB.
31	Doing confocal and live microscopy in my research was definitely primed at the course. SInce we have been adopted techniques such as mycobacterial genetics, computational chemistry and X-ray crystallography.
32	After attending this course, I became significantly more comfortable using a light/fluorescent microscope and how to use it appropriately.
33	All of biology was new techniques for me.
34	image analysis
35	I did not realize how closely intertwined biochemistry and microscopy were until I took this course, and it opened my eyes to a whole new world of possibilities in research.
36	It was a great course. I am very glad I took it.

37	After all the mythologizing, you realize super-resolution techniques are quite easy to implement. The course allowed for multiple exposures to this technique. We use these methods in our lab. We also make more use of confocal microscopy.
38	The substrate work from the Weaver lab was inspiring to include this technology into my own research. Although, on a practical level, it may have been rather ambitious for a two week course.
39	I used TIRF in the course, and now I am beginning to use TIRF in my own lab.
40	The course provided me with the basic tools and language I needed to read and implement a huge variety of molecular biology and biochemistry protocols. It gave me a bird's eye view of the possibilities in biology.
41	My knowledge of microscopy was quite slim, and obtained in the era before automated image acquisition and -processing. These projects gave me the confidence to build my lab largely on quantitative microscopy.
42	Being forced to quickly learn microscopy, to work with a new model organism, or to quickly adapt a model to a new application allows you to stop worrying about mistakes and create something. Back home, you can resume your work at a slightly slower and more accurate pace, while occasionally drawing on the memories from the course when it's time begin a new technique or to take your project in a different direction.
43	I became more aware of TIRF microscopy and its capabilities.
44	I learned about superresolution microscopy, photoconversion/FRAP, computational modeling, etc.
45	I gained confidence to walk up to any microscope and figure out what I needed to do my experiments. Same for other types of equipment.
46	after the course I started to engage much more in biochemistry and helped set up a platform to do protein purification in the physics institute I was at at the time.
47	Before the course, I had designed a biochemical procedure to solve a problem in my thesis work, but only the confirmation from a Physiology teacher that this was the right way to approach the problem actually gave me, in the face of budget and time constraints, enough confidence that the procedure would work to actually implement it.
48	I came in with a strong background in computational science and some background in biology. The Physiology course helped me 'dabble' with different research projects, in a way that no classroom class had. Faculty brought their latest and best ideas with them and allowed us to use their reagents on their leading projects. It really gives you insights into how things work in different research labs.
49	live-cell imaging, flow cytometry, cell free extracts many techniques and concepts were new for me and opened a fascinating world
50	It has increased my understanding of research in biology as a multi-faceted process. However, I also recognized that it is impossible to become an expert in everything and that it is important to stay within one's limits and bounds of knowledge.
51	The microscopy was incredibly inspiring. It made me want to use FRAP.
52	I had never done almost anything biological before the course. As a result of the course I had the beginnings of how to follow biological protocols, or even do simple things like load a gel.
53	Many cell biological techniques look daunting when studied from books but when you get your hands on it with some good help it suddenly becomes feasible to implement them into your own research.
54	the experience with various microscopy techniques as well as protein purifications
55	Many of the microscopy and data analysis tools I used in the class I later applied to my own dissertation research.

18. If applicable, provide some comments/examples of how the collaborative nature of course projects positively influenced your attitude towards engaging in collaborative experiments in your subsequent work.	
Respondent #	**Response**
1	I was very positively impressed by the fact of the existence of the course. World-class researchers go every summer to teach this course to graduate students and postdocs from around the world. Many of the collaborations forged there are continued after the end of the course. I had never really seen a model like that for scientific research. It is a very idealistic model that puts the research above all other considerations. I strive to work in this collaborative manor in my research now.
2	After the course, I started collaborating with biologists on a new project. Having already worked with biologists in the course helped me greatly: I can understand their research and can work as fast as they can in the lab. They don't have to hold my hand every step of the way, which makes me feel like an independent contributor rather than a dependent novice.
3	I came from a very collaborative environment so it was not a huge change, but it was still a positive feature of the course!
4	There were people from different fields, environments. Everybody was extremely helpful and willing to share expertise.
5	My experiences with the collaborations at Woods Hole have made me realize more what makes collaborations successful. Having the same attitude toward science is more important than anything else.
6	I now have a computer modeling collaboration with an instructor from the course.
7	Collaborations were already a big part of my PhD, however as an european it was very interesting to get to know US student.
8	The 7 week immersion aspect of the course was extraordinary in learning the "language" of the new field. Because I was partnered with people with different training, I had to learn to communicate with eachother on scientific grounds in order to make progress.
9	I had already started working with theoretical physicists before going to Woods Hole, but kept on doing so after my participation and also came back to theCourse as a teaching assistance with a PI other than my own supervisor. Furthermore, I had the unique chance of conducting post-course research which was an invaluable experience to me.
10	I came back wanting to work harder, wanting to be more done in a day and wanting to talk to people about what they are doing. I left for the course in a funk about my project and about the environment of my lab. Having the course engage me in a way that my lab and lab mates were not made me realize the importance of communication and so now I make a greater effort to engage my lab mates more. I am also now working with 2 lab mates in closer collaborations, both of which are functioning really well and I believe having to work so closely with others at the course has really made this run smoothly for me.
11	work without the course, but certainly the course has given me more confidence that I can succeed with this project and made me feel that I'm doing exciting, interesting work.
12	The course and my additional times at Woods Hole stimulated interesting projects, i.e. to work on abscission.
13	Not being afraid to ask, having some background knowledge so that I could communicate better.
14	Since the course I actively sought to collaborate with experimentalists. I am currently collaborating with such a team in Germany - and I believe we both enjoy (and find useful) our discussions.
15	It made it clear that some of the most effective science going on involves very basic biologic questions being addressed by biologists at the bench and subsequently modeled by computational groups or physicists. Teaming up in this way throws much more at a scientific problem than biology alone.
16	We were able to accomplish a lot while working in a team, I really enjoyed the "living in the fast lane" aspect of collaboration. It really provided a lesson about how the sum/n is greater that 1/n.

17	Collaboration is awesome, however it's not always easy to find natural collaborations at your home institution. The course made me realize I really need to work in a more collaborative environment, rather than mostly solo as I had done.
18	I conducted post-course work in collaboration with a faculty member from the course.
19	The most important part of the course to me was meeting and working with so many smart, motivated people from different scientific backgrounds.
20	Before attending the course, I had already begun a collaborative project. Taking this course and having discussions on collaborative science, I have a better understanding on how to create and maintain productive collaborations.
21	everyone in the course was willing to try any experiment. this changed my perception of what is do-able when scientists of different backgrounds commit to something together.
22	I had come from one of the most collaborative groups in science... however, it still influenced (positively) my attitude for collaborative science.
23	On my return from Woods Hole, I began collaborating with another lab to learn electron microscopy. Because of Woods Hole, I was enthusiastic about the adventure of learning a new technique and engaging with different researchers.
24	I saw how splitting the work among my group members helped to get good results within short time.
25	Because I was a physicist, I made to to team up in the course with people that knew more Biology. This proved to be very useful and I intend to continue doing so as much as possible in the future.
26	The 'floating' theorists provided unique insights into the various projects, and encouraged me to seek out such collaborations in the future.
27	benefit a lot by bringing together people from different expertises to work efficiently and effectively. Since Woods Hole, I have published more outside my lab than within my lab.
28	I realized I will never be able to learn all the biology.
29	I am strongly convinced that bundling expertise is very helpful for scientific projects. After the course, I expanded collaboration within my PhD thesis. Now, for my postdoc project, which deals with a completely different topic and requires a set of completely different approaches and techniques, I established international collaborations with experts in the field to get help and advice.
30	Working with students without prior modeling experiences, and discovering how able they were, positively influenced my belief in the accessibility of the kind of modeling we were doing.
31	While I am far from being a physical or computational scientist, I (1) gained some knowledge in those areas and (2) most importantly developed my communication skills so that I can effectively talk with other scientists regardless of their background thus making collaborations much more fruitful. The physiology course also helped me realize how systematically dividing a project and working on independent parts tailored to ones interests and skills can make the project as a whole come together extremely efficiently.
32	I am now the only physicist working in a lab of biologists. Collaberations between me an my associates are very productive.
33	I chose a thesis lab where I was the biology end of a collaboration between physicists and biologists.
34	I was impressed by the interplay between theoretical modeling and experiments in Prof. van Oudernaarden's project: this showed me that a productive combination of experiments and models is possible and can be more useful than either experiments or models taken on their own.
35	I was inspired by the amount of effort and committment that my colleagues brought to the course, and discovered how much more I could accomplish as part of a group, where our different backgrounds complemented each other. I have looked for similarly motivated and skilled colleagues in collaborations during my subsequent work, and have been lucky to find a few. Sadly, the real world does not have as high a density of hardworking and generous people as the Physiology course does.
36	I realized that a biological problem is beter approached by including more techniques than I can be specialised in. Besides, brain storming with others is one of the most valuable and enjoyable activities in research. Several of my recent publications testify the collaborative nature of my research.

37	During the physiology course, I loved how everything was collaborative. I've tried to maintain that sense of connecting with other researchers in my every day research.
38	Although I've found it more difficult to engage in collaborations outside of Woods Hole - the lab was a great environment for that.
39	I now have renewed sense of faith in the collaborative nature of science. The goodwill of everyone attending the course, and their desire to teach and learn from one another was truly inspiring.
40	There are some who practice science like soloists, wanting to advance their own views and agendas. It is a common, often successful practice. It is reassuring that you can see first hand at MBL, this is not the only way. You learn who you can work with and who you can't. The right mix of people leads to synergy.I've gained some very dear friendships and collaborators through MBL. We've published papers or still have ongoing projects.
41	Absolutely after I came back to Mexico and started my PhD I started to engage in collaborations for my thesis (as well as other projects) with some friends.
42	This course definitely helps a lot, especially this course unites so many world-top biologist, biophysics etc. It greatly helps set up my network in the community, and potential collaborations.
43	I have been engaged in collaborative research already before the course.
44	Well, it's hard to say because my labmate whom I most frequently collaborate with was also at the course. When we work together on a new technique, I remark that it feels like being at Woods Hole.
45	The collaborators that drink together work well together. Doing science as a team effort with nice, creative, brilliant students made me want to do this all the time.
46	I did not know before I started the course how different physicist and biologists think about problems, and after teh course it was easier for me to understand where the biological standpoint comes from and to respect this different perspective.
47	What I liked best was the healthy respect for microscopists shown by cell biologists - it's clear that a strong background in microscopy was really essential for the kind of projects the biologists cared about. This made it very easy for someone with my skillset - imaging - to collaborate.
48	I chose a cellbio lab for postdoc to share skills with biologists.
49	As this willingness for colaborative projects was present before, the effect was proabably not that strong but my attitude was clearly reinforced by the experience in Woods Hole.
50	Although the course emphasized collaboration etc. I found the highly intensive nature of the course detrimental and unbalanced. The lack of options to interact with people outside of my coworkers and teachers at the course (not only limited to the fact that Woods Hole is a tiny community with limited options for entertainment, exercise etc) was certainly not helpful.
51	I'm quite collaborative by nature, so I quite enjoyed that environment, but don't feel like it changed my attitude much.
52	Everybody have different expertises and the more of these that are focused on a specific project the greater is the chance of obtaining solid results more efficiently.
53	I sought out a postdoctoral advisor that had an interdisciplinary lab in order to maintain the type of collaborative atmosphere I experienced during the physiology course.
54	Collaborative work and strong interactions were what made the science done in the course so fun, and I took that attitude back to the lab with me - the idea of having fun through working hard and playing hard with great colleagues.
55	I already was a physicist doing a postdoc in a biology lab. I don't think I could have a much more positive attitude than I already did! And I came as a TA ...

20. If applicable, provide some comments/examples for how the Physiology Course was an important step in your career as a scientist.	
Respondent #	**Response**
1	It helped me to design new projects afterwards - It allowed me to get offers in top european research centers after my post doc
2	I made an enormous career change that hinged on my successes in the physiology course. I entered the course with the impression that I wanted to pursue a career in biophysics. I graduated with a very solid idea of what kinds of research were interesting to me. Furthermore, I made solid connections to peers in the biosciences with whom I still maintain contact.
3	Got to know a lot of people (networking). Switched from a pure theorist to a part-time experimentalist.
4	I developed this magical ability of understanding all of science. I can ask relevant questions in all kinds of lectures. And it was this course where I learned how to ask the right questions.
5	I changed my intended postdoctoral advisor. I identified how certain skills I had gained in my graduate work could be most usefully applied to Biological problems.
6	Physiology Course made me desire pursue a postdoc which will employ approaches similar to those used during the course. Particularly, matlab has become a tool I use every day and reccommend to other biologists
7	The positive attitude of the Physiology Course has made me enjoy research more, changed the way I do it, broadened my interests and made me more adventurous.
8	I want to build my lab as a interdisciplinary research lab. The Physiology Course helped me a great deal to cross the barrier. Also, I become more affirmative and confident in the lab management after the course. Before the course, I tend to be a "push-over" by the students who make up all kinds of excuses not to reach my goals. That is very frustrating. I saw how faculty members in the course drive students to pursue results with hard work and inspiration. I decided to bring the spirit of Woods Hole back to my lab.
9	It really helps me to realize that I will be more happy in the industry.
10	I found new confidence to pursue a career as a biological physicist - that I could learn a new field and make contributions. Without the course, I probably would have turned to more classic physics problems. Also, the networking component of the course is outstanding.
11	It pushed me. I know where I physically end (with the lack of sleep) and mentally (at the end there was not much left in the tank). Having that kind of stock of yourself is important. On a career note, I met and worked with people that will be helpful to me in the future, and helped me realize just exactly where I want to be in the future.
12	I have been inspired by the subsequent success of colleagues I met in the course, and now, when my research is not going smoothly, I often think back to things I did in the course and positive experiences that I had there, reminding myself that with energy, enthusiasm and a bit of recklessness, I can surely overcome the obstacles I am facing.
13	Before attending to physiology course I was not sure wether I would continue in science or do something else. After the course I was completely sure that I wanted to come to USA and do a postdoc!
14	I came in contact to a lot of scientists. I had very deep and fruitful discussions over the years
15	Exposure, learning about other disciplines, and being fearless in my own experiments.
16	What I love about science is that it helps me understand nature - and how could I work in that direction, without being involved in the direct observation of phenomena?

17	It showed me what it takes to be a top-notch scientist today--what the lifestyle is like, what kinds of topics are being studied, and how the field is most definitely moving in the quantitative direction whether biologists agree with it or not. It made it clear to me that I want to learn as much about modeling, physics for biology, and engineering/systems approaches as possible, because this is where I'd like to head in the future.
18	The course has a strong and enduring sense of community. ASCB is, in may ways, a big physiology course reunion in that the talks and posters I am most interested in are frequently from people who have been associated with the course. I think this is because there is a Physiology Course gestalt/mindset/approach that I very quickly recognized as being the "right way" to do science (for me at least.) Being exposed to it was like a religious conversion, going from "lost" to "found" almost instantaneously. Is that too creepy?
19	I feel like I actually met the field of cell biology while at the course, rather than just knowing the people through their publications. I now know and feel a personal connection to many of the leaders in the field.
20	It gave me a sense of how a life-long friendship in scientific career could start
21	I started a collaboration with Shinya Inoue after an introduction through the course that provided the bulk of my thesis data.
22	It provides a lot of contacts, a lot of experience in both teaching and research and a lot of exposure to some of the best scientists around.
23	Through this course, I became friends with many intelligent and friendly scientists and these relationships will be invaluable in the future. It also renewed and helped me rediscover my passion for science and basic research. I cannot wait to go back to Woods Hole and participate in the future, and the course shaped what kind of research I want to pursue during post-doc.
24	the course gave me a broader view of biology. as someone who typically thinks on the cellular level, there were a lot of opportunities to step outside that and consider the organism and also the molecule. this is something i carry with me every day, the appreciation for how things vary at these different levels, and what the important questions are at each level. my ability to design effective, directed experiments has become stronger - i think this is partly due to the very precise questions each project in the course began with. of course, there was always variation from the initial question, but formulating a good question is a good foundation.
25	This was a life-changing opportunity.
26	Among all things, it helped me to know my interests better and this insight will definitely be useful when I am choosing my future path.
27	It was a HUGE step in my scientific career that I'm thankful for daily. I met wonderful people who I will also be in touch with and I learned invaluable lessons in asking questions, collaborating with people, and remembering the fun in science!
28	The Physiology course gave me a good introduction to biology and microscopy techniques. I think that the fact that I attended it made a good impression when I went to interview for a postdoc position.
29	I learned first hand about techniques and current fields of research that were out of my knowledge before the course. It helped me change field from my PhD to my current postdoc position. I also provided me with a network of established and young scientists I can ask for advice and support when addressing new questions/techniques.
30	The Physiology course was overflowing with passionate and adventurous scientists, and this spirit was absolutely contagious. These interactions inspired me in my own research, and provided valuable contact with world-class scientists early in their careers.
31	It was one of the defining moments of my academic career; showed me that science can be as pure as I thought it would be when I was a kid!
32	See previous comment...
33	The course provided me with a variety of tools that were important for me to start my group: -varied experimental approaches, -network of people -seeing how different people tackle research and supervision
34	Interacting with people form different backgrounds and different career stages was great and helped me take a better look at different ways of doing science.

35	The Course helped me to learn new techniques and laid foundation for my collaborations with two single molecules labs. Furthermore, I met one of my collaborators (Dan Needleman) in the course. Here are paper that came of these collaborations (with van Oijen and with Needleman) Quantitative characterization of filament dynamics by single-molecule lifetime measurements. Mirny LA, Needleman DJ. Methods Cell Biol. 2010;95:583-600. Review. PMID: 20466154 [PubMed - indexed for MEDLINE] Related citations 2. Fast microtubule dynamics in meiotic spindles measured by single molecule imaging: evidence that the spindle environment does not stabilize microtubules. Needleman DJ, Groen A, Ohi R, Maresca T, Mirny L, Mitchison T. Mol Biol Cell. 2010 Jan 15;21(2):323-33. Epub 2009 Nov 25. Dancing on DNA: kinetic aspects of search processes on DNA. Tafvizi A, Mirny LA, van Oijen AM. Chemphyschem. 2011 Jun 6;12(8):1481-9. doi: 10.1002/cphc.201100112. Epub 2011 May 10. Review. PMID: 21560221 [PubMed - indexed for MEDLINE] Related citations 2. A single-molecule characterization of p53 search on DNA. Tafvizi A, Huang F, Fersht AR, Mirny LA, van Oijen AM. Proc Natl Acad Sci U S A. 2011 Jan 11;108(2):563-8. Epub 2010 Dec 22. PMID: 21178072 [PubMed - indexed for MEDLINE] Free PMC Article Free full text Related citations 3. Tumor suppressor p53 slides on DNA with low friction and high stability. Tafvizi A, Huang F, Leith JS, Fersht AR, Mirny LA, van Oijen AM. Biophys J. 2008 Jul;95(1):L01-3. Epub 2008 Apr 18.
36	Exposure in an informal setting to leading scientists, acceptance and positive feedback from students and faculty alike, success with models initiated during this course —all these helped me greatly.
37	I met many wonderful people, many of whom I am still in contact with. This has provided networking opportunities as well. As discussed in previous responses I learned a lot about working on projects as a team and how much work can be accomplished when everyone is focussed on a common goal. This has helped me a lot in motivating and managing technicians working with me on my current project and will serve me well as a PI someday. Finally, also discussed above, the course opened me up to new ideas and new tools thus giving the projects I currently work on more depth.
38	I met my future postdoctoral advisor as a student in the physiology course.
39	It completely changed about how I think about scientific problems. I now find myself thinking about statistics, modeling and biophysical approaches rather than just biochemical ones.
40	Interacting with the top scientists in the field and with really motivated and inspired students and postdocs was a great experience which gave me a lot of confidence to try new things and address real biological questions later in my career.
41	Although I didn't fully learn new techniques or concepts during the relatively short time period of the rotations, the exposure to new areas helped me to more open to learning other disciplines. I also gained confidence in talking to people about subjects that I know less about.
42	It changed my vision of science, gave me self-confidence and confidence in that great research can be done with great peers.
43	i.e., how to solve problem step by step, and also not ignore any details
44	I was able to learn and use new technologies that I would never have been exposed to otherwise, and I was able to interact with brilliant scientists, in some cases personal heroes, whom I would otherwise have never interacted with.
45	The course reminded me of why I became a scientist. Look at a problem and try (try, try, try ...) to do something about. There are many resources in hand - paradigm models, state of the art technology, the excitement and energy of a new challenge. Perhaps the best reminder from the course was that the experience is enriched greatly with true colleagues, kindred souls who are just as (or more) problem driven than yourself.
46	It was definitely a milestone in my scientific career to work with so many brilliant and diverse minds under creative pressure. This course fosters you to push the limits in scientific endeavours, and it lasts and goes with you after the course "ends".
47	Physiology in some sense is my very first and the very important course in biology. I am very proud to talk to my friends that I was in this great course and introduce them to the course. This course influenced me a lot. Before I took the course, I more or less felt biology is hard because there are so many experimental factors I need to worry (I was from computational physical science). But after the course I changed my attitude, and we just need to "try it".

48	It was the first time I got some significant teaching experience: Through lectures, tutorials and project supervisions - and was surprised how much I enjoyed this. I got into contact with the leaders of my field and related fields. There is still a great bond between all of us, and it makes it so much easier to collaborate and ask for advice. I got two papers out of the two years: One as the unofficial main supervisor of the student project. This developed into my first paper as a primary author. And one in a collaboration with a principal scientist at the NIH whom I wouldn't have met otherwise.
49	I can't imagine feeling as confident about learning new techniques and asking new questions if I didn't have the Physiology course.
50	First wider exposure to like-minded individuals working in q-bio type projects.
51	Meeting people, getting ideas about what I wanted to do my postdoc on, giving me experience with the MBL that lead to me getting a summer fellowship in a subsequent year, starting a new project based on the work of my students.
52	I met so many people that I still interact with today and help me doing my science, that I never would have met otherwise because they have a very different background
53	I received a broad overview of topics in the field, enjoyed discussions with eminent researchers, and felt that I had something to contribute. I am more confident now than previously that I am suited for a research career.
54	Physiology course-talks were very stimulating and influenced my thinking as a scientist. It made me realize the importance of asking unsolved problem in Biology. In fact I changed my research direction after the course and enjoying in walking on a unknown path.
55	I met my future postdoc mentor who was a visiting scientist at the Physiology course. It was in a completely informal venue and we were just having a couple of beers and chatting about science. In fact it was two years after our first meeting that I joined my postdoc lab. I have met people who share my passion for science and are willing to try anything, no matter how off-the-beaten-path it is. Most established scientists question your sanity when you ask 'why don't we try this'. They usually give a long history of what they think has worked and why. 'So and so tried it in the 70s' - why do you think we are doing things the way we do them now'. Most people in the Physiology course ask 'Yeah ... why not' and that is where most revolutionary science begins.
56	This changed my direction from single molecule biophysics to microscopy. It also was very valuable to meet other like-minded people, to develop a strong network of peers, and to meet some world class researchers.
57	- I wasn't used to seminar series and was delighted by the quality of the morning lectures. 1.5 hrs every morning from such high profile people was fantastic. It taught me how great science should be done and presented. - The opportunity to use and discuss some much microscopes and model organisms has helped me tremendously - The overall spirit of enthusiasm for exciting and thorough science convinced me to pursue a career in science
58	It provided onw example of the type of interdisciplinary science that came to dominate my later career and that I see as the main task for the current geenration of scientists at the interface between cell biology, computation and physics.
59	The highly intensive nature of the course was detrimental to me in that I returned back to the laboratory I worked in at the time (Spudich lab, Stanford University) with a serious burnout condition which a few months later got worse to become a full blown major depressive episode (medical diagnosis). In retrospect, several years down the road, I regret having taking this course and it has made me wonder whether, despite my continued like of science, I still want to be a scientist.
60	It made me want to be a scientist and not just a research assistant.
61	My choics of postdocs was strongly determined by the ideas I found most interesting at the course (and many of which I was learning about for the first time).
62	I met scientists that excited me, and I found an area of research I love. Unfortunately, life has gotten in the way since then, and it is unclear if I will be able to follow that path, so "strongly agree" is possibly a more emotional than factual response to this question.
63	I met my postdoctoral advisor there - what I worked on during my postdoc has shaped my whole scientific outlook and the orientation of my independent research program.
64	Mentoring students in the intense environment of the Physiology course and seeing how much could be accomplished during that time was great.

22. Provide some comments/examples for experiments/questions that you were exposed to in the course and continued to work on after the course was completed.	
Res-pondent #	**Response (not coded)**
1	Cell division and spindle orientation (with tony hyman) - Cell mechanics and polarity (with clare waterman)
2	It was a project identified by a course faculty and myself. The faculty invited me to his/her lab and facilitated the project.
3	I worked on phage DNA ejection during the course and continued to work on the same problem afterward.
4	As a TA I began a project working with the physiology students and later completed the project at my sponsoring laboratory. We studied and answered questions related to microtubule dynamics and endothelial cell morphology in 2-dimensional and 3-dimensional collagen matrices
5	Image analysis
6	A question for my thesis was how a Kinesin-8 family protein could act as either a depolymerase or a capping protein. Those two models for the behavior of this protein was out in the field at the time I took the course. I collaborated with Melissa Klein Gardner during my rotation with David Odde to use mathematical modeling to affects these two different types of proteins would have on the average length of a population of dynamic understand the microtubules. After the course I continued this collaboration with Melissa and the results from this work is published in Current Biology. Reference: Weaver et al. (2011). Kif18A Uses a Microtubule Binding Site in the Tail for Plus-End Localization and Spindle Length Regulation. Curr. Biol. 21: 1500-1506
7	I am still very curious about how cells sense the dimensionality and respond to it. I would like to do more experiments to understand it.
8	I worked on focal adhesion properties dependent on the activation of Rho and Rac. Post course, I continued to work with Clare in order to complete the FRAP characterization of focal adhesion associated proteins. More influential that the particular experiment, was the question of how are extracellular matrix conditions detected by the cell and do they influence cell behavior/phenotype. I continue to work on this problem in my own lab, but now in the context of wound healing and cancer metastasis
9	In one project, we worked on non-centrosomal microtubule generation in S2 cell spindles, which I kept working on in a post-course research project afterwards, and from which a publication ensued. In another project, we worked on the dynamics of the cell cortex in the C. elegans zygote, which is a question that was very closely related to my PhD project, and on which I kept working on and my thinking has strongly been influenced through my stay in Woods Hole. For this part I also had thengreat opportunity to come back as a Teaching Assistance to the course, and work on similar questions with students in the subsequent year.
10	Spindle and centrosome structure in C. elegans
11	In the course we "played around" to test the limits of the use of high-throughput imaging in mitosis. It happens to be very useful and were were able to push in forward in two projects. For me, the excitement of taking to such a challenge and making it happen, with collaborative hard work, was really the essence of the greatness of the course for me.
12	During the course I studied cytoskeletal dynamics in worm embryos. I worked on a follow-up project in collaboration with a faculty member, which played a big role in my choice of postdoc research. My current postdoctoral research project involves studying cytoskeletal dynamics and morphogenesis in fly embryos.

13	Jonathan Alberts' section on agent-based modeling was particularly useful and thought-provoking for me. I adapted one of his models to look at cell swarm interactions with the hydrodynamic environment of a motile cel in liquid culture.
14	Polarized light imaging, protein purification. (these were more techniques I was exposed to rather than questions).
15	We worked on modeling a protein gradient in bacterial cells, and did some microscopy experiments to test the model. I continued to work on it for several months after the course was finished.
16	Matlab projects for tracking single molecules
17	I was the TA for a project that started the year I was there and has continued for the past 2 years. I have been involved in some aspects of continuing the project, writing abstracts, etc. even though I have not attended the course again.
18	Interaction of signaling molecules from different modules in collective cell migration.
19	I worked on detecting steps of molecular motors in single-molecule data. After the course, I continued the work by visiting one of the Physiology faculty's lab (Ron Vale).
20	I have done extensive reading and preparation for later work using one of the model systems for my future research as an independent researcher.
21	1. Work on single filament ParM/ParC interactions (with hernan Garcia) 2. Work on computational modeling of ParM polymerization with John Alberts and Leah Trichet
22	see my previous comment
23	ParM dynamics and plasmid segregation. Actomyosin network modeling.
24	Following the course, I visited Dyche Mullins' lab at UCSF to work a project that was started during the Physiology course. The work was never published, but I enjoyed the opportunity to visit their department and meet people there.
25	Numerous times I have been able to recall things I learned in the course, which have had direct application to my current work in discussions or the design of new experiments. This is because the content covered in the course was so broad.
26	I continued to work on symmetry breaking of actin networks around ellipsoidal bead substrates with the Mullins Lab for several months after the Physiology course. This work was then used as the experimental complement to a published computational paper Authored by Dr. Mark Dayel with the Mullins and Mogilner Labs.
27	I continued to work on the traction microscopy project with Sergey Plotnikov and Achim Besser for some time after the course, though it eventually lapsed.
28	I was exposed to new imaging technologies (e.g. structural illumination EM-CCD cameras, Bessel beam microscopy) which I had never used, but now I am planning to use in my postdoc.
29	Continue to investigate how alpha catenin binds to actin filaments.
30	The course project mentioned above was continued in the next year and published later. I am still using the methods we developed there. I helped an NIH PI to analyse his data; this continued after the course finished.
31	I continued working on software that was partially developed during the course
32	I finished up some work with Christine Field on actomyosin contractions in Xenopus egg extract that resulted in a publication.
33	I was exposed to some fantastic neuroscience research while going to talks at the MBL, and decided based on that to go into that field for my postdoc.

34	Some experiments performed with students I followed up on and presented at research conferences (with students as co-authors).
35	Two of the three project continued after the course. One on osmo-regulation in yeast -- I went to MIT to work further on that project. Second on primary cilia transport in mammalian cells -- went to the NIH to continue work on that project.
36	Projects were designed by me (as TA) and motivated by or related to my own postodoctoral work. Therefore parts or ideas from the course were directly followed in my own work afterwards.
37	I continued to work on regulatory mechanism of intracellular dynamics of myosin molecules in dividing cells after the course.
38	I was looking at dynamics of Bcl-2 network and how it's perturbed in paclitaxel-induced mitotic arrest. My student and I (I was a TA for the course) found very interesting differential localization pattern of a couple of proteins, which I continue to work on to explore molecular mechanism for apoptosis control in mitotic arrest.
39	The emergent properties of actin networks.
40	The team of Francois Nedelec demonstrated their modeling tools during the course. It was evident that these were the tools we needed to pin down the mechanism of microtubule selforganization in fission yeast, on which I was working at the time. Within a year we were able to successfully submit our work to cell.
41	At the course I studied the physical character of protein-RNA granules in cytoplasm. Though I did not have the ability to work this question in a lab setting after leaving the course, I applied bioinformatic techniques to continuing searching for insight.

23. Did the post-course investigation involve any of the Physiology faculty, TAs or fellow students? (If YES, please describe in the box below.)

Res-pondent #	Response	Faculty, TAs, students
1	I worked with Rob Phillips and several students from his lab during the course on the phage ejection project, and afterward I visited Rob's lab for several months to continue working on the project.	Faculty, students
2	Yes, other TAs and Faculty were involved in the post-course investigations	Faculty, TAs
3	Collaboration with Melissa Klein Gardner from the University of Minnesota	?
4	I keep in touch with people from Physiology and discuss with them about my ideas whenever there are opportunities to meet them.	?
5	I continued to work with Clare Waterman in order to complete the project begun at MBL There was some discussion of continuing with Ron Vale and Derek Applewhite on a project, but it worked out better for Ron's lab to complete the project on their own.	?
6	For the first part I went to Japan to work with Gohta Goshima and also interacted with Ron Vale. In addition, fruitful discussions with Ed Munro strongly inspired and influenced my thesis work	?
7	The post-course investigation on our T-cell project incolves guest faculty Eric Betzig and Liang Gao	Faculty
8	I continued to work with my TA to follow-up on discoveries made in the course. When that project was over, we felt we were such a great team that we wanted to continue to work together on another project that later turned to a Science paper. I had many collaborations since, but that was probably the most intense and fun one I had the pleasure to be a part of.	TA
9	I did post-course research with Ed Munro at the Center for Cell Dynamics. We worked on developing a new approach for simultaneously probing actomyosin dynamics and force generation in the c elegans embryo.	?

10	I am trying to remember for sure but I think two of my committee members were at the course - Mahadevan from Harvard and van Oudenaarden from MIT. I had met them before the course so I don't think the course influenced my interactions with them very much.	Faculty
11	We've had students come out for a few months to continue the project in the past. THis year we have one student who has continued to contribute to the anlaysis code after the experiment.	Students
12	It involved both a faculty and TA.	Faculty, Tas
13	I worked with the TA and faculty at their home institution reproducing the results and getting more data	Faculty, Tas
14	I traveled to Ron Vale's lab to write Matlab code.	Faculty
15	Soon after the course several of the students revisited some of our experiments and as the TA I was involved.	Students
16	Yes, Ron Vale (faculty), Andrew Carter (TA) and David Wu (student).	Faculty, Tas, students
17	For my postdoc I joined the lab of a faculty I met in woods hole	Faculty
18	I functioned as a TA for many years in the course. In two cases post course research occurred, as detailed above in 22.	
19	I continue collaborating with Dan Needleman whom I met as a fellow student at the Physiology Course.	?
20	From both the 2005 and 2008 experiences I continued work on projects started during the course. The work started in 2008 continues and included communication/poster presentation with the students for sometime after.	Students
21	see #22	
22	I visited the Phillips lab at Caltech twice after the course and continued to collaborate on a project begun at the physiology course. The project has grown into the thesis project of one of the Phillips lab students and has results that have been submitted for publication.	?
23	Prof. Dyche Mullins, and Dr. Orkun Akin (not a TA during my year, but a TA in previous years).	Faculty
24	See 22.	
25	I am now doing a postdoc in Jennifer Lippincott-Schwartz's lab, and will be working with a scientist, Prabuddha Sengupta, who works in her lab and who was a TA for the course.	Faculty, Tas
26	Currently performing biochemistry experiments with a former TA from James Nelson's lab.	TA
27	As a lab, we've had a few Physiology alumni continue their MBL projects. Personally, one has lead to a publication. With other TAs, I've had two ongoing projects related to cell biology and bacterial physiology.	?
28	I worked on a project that included Rong Li, James Ferrell, and Tobias Meyer.	?
29	Yes, all of them.	Faculty, Tas, students
30	I was a TA	
31	Christine Field and Tim Mitchison	?
32	Both TAs and fellow students gathered at UCSF to do more experiments	TA, students
33	I continued working for my PI, who happened to be course faculty at the time, and later a course director.	Faculty
34	Some experiments performed with students I followed up on and presented at research conferences (with students as co-authors).	Students
35	Following the Physiology Course, I developed new imaging methodologies with Kurt Thorn, who I met at the course. We have recently submitted our work for publication. I have also continued to work and collaborate with Dylan Burnette and the JLS lab.	?
36	In both cases mentioned above, I continued work with the course faculty and TAs.	Faculty, Tas
37	Ron Value (faculty) Gohta Goshima (TA). I spent a few weekdays working in Ron's lab so I could present a poster at ASCB.	Faculty, Tas
38	One follow up publication was performed with a Physics student participating in the course.	Students

39	Ron Vale, Jim Spudich, Gohta Goshima and Eric Griffis	?
40	I was a TA in the course and I'm working on this post-course investigation with Tim Mitchison, the physiology faculty.	Faculty
41	Dyche Mullins, Garry Odell, Ed Munro, Jon Alberts	?
42	I continued for a bit to work with michael brenner, but then moved on to other things.	?
43	I continued to communicate with the TA I worked with at the course, and a publication resulted.	TA

24. Did any work started in the Physiology Course result in a publication or abstract? (IF YES, indicate in the comments box below whether the Physiology Course was mentioned in some manner.) Publication or abstract? PHY mentioned?

Res-pondent #	Response	Publication or Abstract?/ PHY Mentioned?
1	There was a Science paper published based on the research that we started in the course that summer. I want to say that although the course was mentioned in the acknowledgement section of the paper, the author list included an arbitrary subset of the students who were directly involved in that research. Since every student in the course intends to pursue an academic career, I think there should be clearer guidelines for how students are acknowledged for their intellectual contribution to work that is later published.	paper; yes
2	Abstract for ACB	abstract; ____
3	The Physiology Course was recognized in the acknowledgements.	yes; yes
4	the course was mentioned in acknowledgements	yes; yes
5	Poster presentations at the ASCB meeting	yes; yes
6	Paper published in Current Biology lists MBL Physiology Course affiliation for two authors: Kif18A Uses a Microtubule Binding Site in the Tail for Plus-End Localization and Spindle Length Regulation	yes; yes
7	Yes. I also put other students as a co-authors in the paper.	yes; yes
8	It gives rise to at least two differents poster at the next ASCB meeting	yes; yes
9	Yes	____; yes
10	Yes the physiology course was acknowledged in three abstracts submitted to the ASCB meeting and in two publications	yes; yes
11	We contributed a poster to ASCB 2007 and the Woods Hole and post-course research resulted in a publication in JCB.	yes
12	yes. ascb poster abstract	yes: ____
13	Yes. A publication where the course was mentioned in the acknowledgements, and an abstract for ASCB where the course was mentioned in the poster.	yes; yes
14	This work was initiated as a project in the Physiology Course at the Marine Biological Laboratory in Woods Hole, MA.	yes; yes
15	Yes. the paper was submitted two weeks ago and we acknowledged students who were involved in the project during the physiology course	submitted; yes
16	We presented a poster at ASCB and physiology course was mentioned.	yes; yes
17	Abstract at the ASCB meting (2007). Physiology course was mentioned	yes; yes
18	No, but there was a project that I started during the course, that I have been hoping to set up a lab so that I can proceed with the experiments. These could lead to a publication.	no
19	Two papers: Current Biology and Science, in both the course was mentioned in affiliations. Several ASCB posters, again course mentioned in affiliation.	yes; yes
20	Yes, the course was publicized on the poster	yes; yes

21	Two ASCB abstracts and a paper. The course was acknowledged in all three.	yes; yes
22	The work resulted in two abstracts/poster presentations at ASCB annual meeting. The physiology course/MBL was listed in the institution list and acknowledgments	yes; yes
23	But it could eventually if I find the time to write it up	no
24	Not yet, the experiments are ongoing.	no
25	Poster for ASCB Article on teaching Stat Mech to life scientists inspired in our experience at the course	yes: ____
26	Yes - An ASCB abstract at 2007, which mentioned the Physiology Course.	yes; yes
27	yes, it was. Multiple times.	yes; yes
28	Yes, it was mentioned and has been an abstract for several years (continuing project) at ASCB etc.	yes; yes
29	we submitted an abstract to the MCB meeting, 2010	yes: ____
30	2 ASCB abstracts	abstracts
31	poster at the ASCB	abstract
32	A paper has been submitted to Nature Structure and Molecular Biology. My address in the paper will include the MBL.	submitted; yes
33	Yes, the physiology course was mentioned in publication	yes; yes
34	it was mentioned in the Acknowledgments.	yes; yes
35	Abstract at ASCB and BPS with the course/MBL listed as author affiliations	yes; yes
36	ASCB posters, course was mentioned	yes; yes
37	Quantitative characterization of filament dynamics by single-molecule lifetime measurements. Mirny LA, Needleman DJ. Methods Cell Biol. 2010;95:583-600. Review. PMID: 20466154 [PubMed - indexed for MEDLINE] Related citations 2. Fast microtubule dynamics in meiotic spindles measured by single molecule imaging: evidence that the spindle environment does not stabilize microtubules. Needleman DJ, Groen A, Ohi R, Maresca T, Mirny L, Mitchison T. Mol Biol Cell. 2010 Jan 15;21(2):323-33. Epub 2009 Nov 25.	yes: ____
38	Poster presentations at ASCB. Work on publication still ongoing. Physiology course was credited in the posters and may be in the publication.	yes; yes
39	Yes, the physiology course is mentioned in the author affiliations.	yes; yes
40	The Physiology Course was mentioned as the primary location where the work (presented on a poster) was conducted.	yes; yes
41	yes	yes: ____
42	Abstract for ASCB annual meeting and Physiology course was mentioned on the poster	yes; yes
43	The Physiology Course was mentioned in the institutional affiliations section of the paper.	yes; yes
44	There were 2-3 posters on teh research done in the course at the subsequent ASCB Meeting.	abstracts
45	I gave a poster presentation at the ACSB Meeting in 2007. The Physiology Course was mentioned as an affiliation of all authors. In Vitro Studies of Actin Network Assembly and Mechanical Failure. V. I. Risca,1,2 K. E. Kasza,3,2 A. Hilfinger,4,2 R. D. Mullins5,2; 1 Biophysics Graduate Group, University of California, Berkeley, CA, 2 Physiology Course, MBL, Woods Hole, MA, 3 School of Engineering and Applied Sciences, Harvard University, Cambridge,MA 4 Department of Systems Biology, Harvard Medical School, Boston, MA, 5Cellular and Molecular Pharmacology, University of California, San Francisco, CA	yes; yes
46	The work I did with Scott Hansen and Dyche Mullins ended up being presented at the ASCB 2010.	yes: ____
47	Physiology Course was acknowledged.	yes; yes
48	For talks and posters presented at ASCB (2009 and 2010), the Physiology course was referenced.	yes; yes
49	Yes, the course was listed in the acknowledgements.	yes; yes
50	Yes	yes: ____

51	two abstracts presented at the American Society for Cell Biology Congress. The course was mentioned in both abstracts	yes; yes
52	The course was cited.	yes; yes
53	ASCB abstract	yes: ____
54	Yes, the course project was presented at the ASCB meeting as a poster and later published in PBMB, giving the MBL Physiology course as an affiliation for all the authors. The other collaboration was published in J. Neurosc.	yes; yes
55	As an abstract (poster) for ASCB.	yes: ____
56	Yes the course was cited as one of my institutions.	yes; yes
57	So far just an abstract, but a publication (listing Physiology as an affiliation) is in revision.	abstract
58	The physiology course was indicated on the posters	yes; yes
59	Our group worked on integrin dynamics. I have now presented directly related work at major conference (ASCB, BMES, etc) and a manuscript is in preparation.	yes: ____
60	Yes but the paper is still under review. The physiology course is acknowledged in the acknowlegdements.	submitted; yes
61	Both of the aforementioned projects resulted in abstracts for ASCB 2006 and subsequent posters. The Physiology course was mentioned in both.	yes; yes
62	physiology course was mentioned in ASCB abstract	yes: ____
63	Abstract at ASCB 2005 with PC as affiliation	yes; yes
64	Not started but interactions contributed to ideas that later turned into publications.	no
65	The course was mentioned in those papers and abstracts.	yes; yes
66	The course was mentioned as the author's affiliation.	yes; yes
67	I don't know, and I actually wasn't informed of being the fourth author on that paper by any of the other authors.	
68	ASCB 2009 abstract	yes: ____
69	Students of the physiological course whom worked on the project were thanked in the acknowledgement section with affiliation: physiology course.	yes; yes
70	My affiliation was listed at MBL, rather than my home institution. The course was not mentioned by name however.	yes: ____
71	poster at ASCB	yes: ____
72	Poster Abstract at the ASCB 2007. MBL Physiology was mentioned.	yes; yes
73	acknowledged on ASCB posters	yes; yes
74	Physiology course was mentioned	yes; yes
75	I am a coauthor on two papers resulting from work performed in the physiology course, both of which list the MBL and mention the physiology course.	yes; yes
76	Only current affiliations. I will add!	yes: ____
77	an abstract for ASCB, with Physiology Course	yes; yes
78	I presented two posters at ASCB based on my Physiology course projects.	yes: ____

25. What was the best aspect of the physiology course from your perspective?	
Respondent #	**Response**
1	The fun !!
2	Its very existence. Everything. I don't know how to choose only one aspect. It's perfect.
3	The work hard play hard attitude! Even in those low moments that lab life brings here and there, you always remember Woods Hole and how much you can accomplish if you beleive it and work hard, with good fun in the middle, of course!
4	The freedom to try risky experiments one may not try at the home institution and the collaboraive nature (like a family)of the course.
5	Talking and discussing with people. Lab work.
6	Gaining the self-confidence and clear mind needed to do great science.
7	Exposure to a enthusiastic, smart, supportive group of people that have a similar philosophy of science and are interested in similar types of questions.
8	Being enclosed in a small place with all amazing people from different fields. Being engaged in cutting-edge questions and using state-of-art modern technologies
9	Meeting other young scientists and networking provided a valuable group with different areas of knowledge that I know I can turn to with questions.
10	expert faculty and dedicated students.
11	Working with inspiring and highly motivated people with a positive attitude.
12	Meeting different students from around the world and working with them and creating a network of scientists was the best aspect. In addition, meeting with Matthew Messelson was the highlight of the course for me and enhanced my passion for "basic biology." In addition, my thinking about science has become more broad and after I returned I had new views on where I wanted to go for my research for the remainder of my thesis.
13	Fun.. You can 100% immerse yourself in a stimulating scientific environment during the course. What a luxury.
14	Meeting and interacting with bright people who basically share the same problem as me
15	Meeting in a completely relaxed, yet focused, setting with some of the best minds of my generation as well as the opportunity to discuss with the giants of the field. Where else can you have a beer at night with the man who practically invented modern video microscopy while discussing how to problem shoot a friend's experiment of that day? No where else that I've found or heard about.
16	The physiology course is unsurpassed in bringing top scientists together with enthusiastic students for a focused 7 week effort towards discovery. The intensity of the course, akin to a boot camp experience, insists that commaraderie will emerge between people of different scientific backgrounds which harnesses everyone's creativity. Much like the emergent properties which occur in the systems we study, the benefits of the physiology course surpass the sum of its parts. It remains the highlight of my education.
17	Interacting, discussing and working closely together with like-minded scientists, which generated a network of professional and personal contacts that has persisted ever since.
18	I have a better understanding of what is possible, a better resource pool and skill set to make it happen professionally, scientifically and personally. Plus I've got some really great friendships out of it to boot.
19	Teamwork and new true friends.
20	interaction with students, TAs, and faculties.

21	(1) Interdisciplinary communication.Physiology course provides a platform where people from diverse background can come together and work together to solve a common problem. (2)The morning lectures followed by the interaction with the speaker
22	During the course, I was alternatively curious, frustrated, excited, depressed, exhausted... often all at once actually. It wasn't non-stop fun, but ultimately I think the best thing was just being there- in an intensive, high-energy environment where the focus was on science all the time. It was inspiring for to see how much can be done when you live and breathe science, surrounded by creative and enthusiastic people who are all doing the same.
23	No boundaries for scientific discussions.
24	The people - lots of great scientists (both lecturers and students), and good interaction between them, both in the lab, the classroom, and at The Kid!
25	The interdisciplinary environment
26	The incredible generosity of leading scientists with their time. Learning from very close different styles and approaches for successful research. The real experiments, that were not just teaching examples but cutting edge unpublished research.
27	Seeing what highly motivated people can do when they let their imagination go free.
28	The love and enthusiasm of the students and the PIs towards research. Science at its best.
29	Exposure to so many awesome scientists in the form of PIs, postdocs, or students from around the world with such diverse backgrounds culturally and scientifically. To be able to learn so much from such a close-nit community was simply amazing. I literally felt like my eyes had been peeled back and left open to an entirely new way of approaching science. Loved it.
30	Science is fun and exciting, but in our daily lives as scientists the excitement is "diluted" in our daily lives. In Woods-Hole it was pure high dose of really fun and exciting science. It was so intensive that I don't think I could take more than a few weeks at a time. But the in the course the science was as fun and exciting as it could be.
31	Learning computational and biophysical techniques. And meeting great scientists (peers, faculty, guests).
32	The best aspect was that all the participants had to interact in a close range, both intellectually and personally. I think that makes research better and more enjoyable for everyone.
33	The very, very deep sense of community among the students, TAs, and instructors.
34	For me, the Physiology Course was the last time science was fun. We explored questions and performed experiments just because we wanted to know what would happen. When I returned to grad school, it was all committee meetings and publish! publish! publish! and it just wasn't the same.
35	The tremendously dynamic, collaborative, and fun research environment.
36	Meeting and spending informal time with so many great scientists
37	closely work with enthusiastic colleagues
38	The amount of energy that the students and instructors brought into the lab was something I have never seen since. It was not a sustainable amount of energy but it was a really great thing to be a part of. I loved working with other people who were smart, motivated, and tireless, and came from different backgrounds.
39	The nurturing culture - everyone was there to help you learn and understand new things. You could never be afraid of asking too many questions.
40	the complete immersion in both the science at hand and also the leading science being presented was both unique and extremely beneficial. you can read papers and go to talks by all the scientists in your field, but you can get really creative ideas from hearing from people outside the field, outside the discipline, even. that there was such a variety (both in personality and in scientific interest) of students and lecturers and faculty leaders, and that all those people wanted to both learn and teach, was at the heart of the course.
41	Everything.

42	The best aspect of the physiology course was being able to dialogue with people from diverse scientific backgrounds, and combining our strengths to tackle a common problem.
43	Interacting with many enthusiastic people. To do science without much of the politics involved.
44	For me, personally, it was being allowed to learn how to advise and (sort of) direct a group of students to perform new experiments and learn new skills.
45	exposure to new research areas
46	play hard, work harder!
47	The amazing people!
48	The collaboration of people from different background to create something really cool!
49	Everything!
50	Getting to know people that do interesting reseatch, talking to them and seeing how they think about experimental challenges and new techniques.
51	It is a bubble outside of "regular" life that gave me stronger confidence in my scientific abilities. In addition, it turned out to be a great place to not only make scientific acquaintances, but also friends with extremely diverse scientific backgrounds.
52	Microscopy was introduced very well - from basics to most modern techniques.
53	opportunity to learn mentoring students opportunity to try new techniques
54	The people: students, professors, TAs and guest lecturers. It was a very special experience to share bench space and discussions with such a great group.
55	The removal of all variables intrinsic to everyday academic life that are not in the reaction coordinate of cool scientific progress! Except having to chew and doing laundry, all was gone, and it was wonderful to be able to be focus on science 100% of the time. I wish I will have this again in my life!
56	Meeting others, scientific discussions and making contacts
57	An intensive opportunity to immerse myself in exciting research and network with a supportive community of scientists.
58	The course reinvigorated my love of science. By stripping away the pressure to publish and allow very exploratory questions to be asked, it felt like science camp. I was reminded why I went into science. It also showed my how much could be accomplished in two weeks if you put your mind to it.
59	The fun of doing science with some of the brightest people, 100% committed to that 24 hrs a day.
60	the collaborative, high energy nature of the course, where there is no competition and only cooperation.
61	The interdisciplinary. There were completely different backgrounds between us and we all loved to learn more about it.
62	Th enthusiasm of everyone associated with the course- especially the PIs and TAs. It was somewhat freeing to discuss a whole range of things different people found interesting problems instead of the more publication-focused way graduate school research discussions tend to go.
63	The interdisciplinary nature of the student body.
64	Along with a number of invaluable experiences I made and important lessons I learned, the best aspect of the course was meeting the people: top-class faculty, outstanding scientist, bright students... I made some really good friends that I wouldn't want to miss in my life.
65	The intensity, both socially and scientifically. These interactions seems to —magically— lead to close friendships and rapid scientific progress/understanding.
66	Addressing real problems with a diverse group of really smart colleagues and great resources in a beautiful setting. I think the intensity of the course given the time pressure etc also added to the experience. I also very much enjoyed the guest lectures.
67	Getting to know an international group of colleagues with similar interests.
68	The exposure to people with many different backgrounds who approach the same problems from different perspectives.

69	The different people I met, the kinds of questions and approaches that were new. A realisation of the burning questions and concerns of science today and what to look forward to in the future.
70	The breadth of backgrounds that the students and other participants brought to the course, which lead to many interesting discussions.
71	Exposure to interdisciplinary research
72	Hands-on laboratory experiments on a wide variety of cell biology topics and the chance to interact with world-class students and lecturers - this really built up my confidence and my sense of excitement about cell biology.
73	The collaborative effort and subsequent network of my classmates. Its been amazing to have a special connection with colleagues from so many different disciplines and backgrounds.
74	Making me realize how much I still loved doing science.
75	The people, and the pervasive sense of collaborative effort.
76	spirit
77	For me, I enjoyed learning the details of new techniques and how to use them for research. I learned not only from the course instructors but also my fellow students. The peer-to-peer learning built a strong sense of community that I really appreciated.
78	The attitudes towards biological research that it exemplified. As it was my first real exposure to biology as a discipline, it had a major influence on my approach to the field. Also, I had a sort of fantastic (in the sense of "fantasy") vision of what the course would be like beforehand, while realizing that the thought was silly. But as it turned out, it really was like that.
79	It provide a chance for young scientist of different background communicate
80	getting an idea of what it can be to be a scientist
81	The excitement. Research has never been as intense, fun and challenging before or since. I wish I could go back and do research and interact with scientists the way I did during the course all the time!
82	Interacting with the diverse, yet consistently brilliant students and instructors in the course.
83	Meeting so many scientists and maintaining those friendships after the course.
84	The "can do" attitude of the faculty, both past and present, is powerful motivation. You have to get over the fear of failure or fear of wasted effort. Learn from the mistakes and avoid them in their next incarnation. If you sit around worrying about if it's worth your time, you won't really learn anything.
85	Interaction
86	Everything... it was simply amazing and I have very fond memories of it. I would love to come back to the physiology course.
87	Non-stop science with like-minded individuals and a wealth of resources for 6 weeks. Also lots of time and attention from exceptional faculty and staff.
88	The best part for me was the brainstorming and project design.
89	The chance to expose so many fantastic biological problems with the world-top experimental techniques, faculty/TAs, and great classmates.
90	Making friends with like-minded scientists from all over the world; being exposed to ideas and techniques from some of the world's best scientists.
91	It showed me so many new possibilities beyond the ones I was air with.
92	Meeting brilliant, highly motivated scientists. Working with them on a practically equal level. Getting an insight into their thoughts and methods. GEtting a go on the most advanced equipment and being shown by the experts how to use it.
93	Interaction with students with diverse interests and backgrounds and to use this environment to generate new research ideas.
94	The mix of young and older researchers, people at all stages of their careers, from many different backgrounds. This made the course open-ended, even inchoate, a perfect environment for scientists to learn.
95	exposure to various techniques and people from many different backgrounds

96	Learning new techniques and model systems
97	Being in the intense and creative environment of the MBL, and being the best course there (doing novel, exciting research and not just doing "laboratory exercises.") And crushing Embryology at softball.
98	The opportunity to work with top world scientists and outstanding students from a range of disciplines in an intense and highly stimulating environment.
99	The intangible excitement about science and the openness of most students and faculty to new ideas.
100	The network of friends and colleagues I met through the Physiology Course is exceptional. I strongly believe that I will continue to interact with many of these people throughout my career. The scientific enthusiasm displayed by students, faculty, and TAs solidified my desire to seek a career in scientific research.
101	the fact that you get exposed to so many different subjects and people that all are excited about what they are doing, and are excited to hear about what you are doing. I think this what science should be like, sharing the excitement of doing new discoveries, either just by being in a lecture and hearing something you never heard about before, or by sitting behind the mike and getting all excited together with some other random person you never met just 3 weeks before.
102	Hard to say -- intellectual camaraderie with both fellow students and the faculty and TAs. Also, exposure to the best microscopy equipment and techniques available.
103	the combination of freedom (to experiment on a whim without publication pressure) and resources (in the form of infrastructure and interesting people to have discussions with)
104	Meeting so many great scientist and learning about their career-path from themselves was the best aspect according to me.
105	The people and their love for science without barriers and egos.
106	Meeting like-minded peers that I continue to interact with today, working hand-in-hand with faculty, the 'jolt' that I got working long hours with very driven people and the realization as a graduate student that I could do something completely different as a postdoc
107	lectures - instrumentation - discussion with faculty and peers of mixed background
108	The ability to think of something and try it immediately, and having all sorts of smart people to collaborate with immediately if necessary.
109	The intense interactive atmosphere between all aparticipants, which generated many ideas and conceptual advances. As TA I think I learned as many new things (in my case mostly technical and realted to computational aspects) as the students.
110	the scientific interactions with students and faculty
111	Working with excellent people intensively.
112	Its interdisciplinarity. It let me learn the impacts of computational and biophysical approaches on cell biological research.
113	The best aspect of the course is that students get to work on a real new project instead of just learning some techniques or repeating some other people's results.
114	Interdisciplinarity
115	The collaborative spirit
116	Interacting with faculty, postdocs and students from diverse backgrounds
117	The intensity and excitement of cutting edge science experienced while at the course is inspiring.
118	I really liked the mixture of amazing lectures every day + really intense lab time. I think the best part learning from and with the other students.
119	Working hard in the lab with a team of fun and committed people.
120	The Woods Hole environment and the intensity and spirit of the course.
121	To be able to work together with your peers. You generate an excellent scientific network and learn new tools in the process.

122	The people, no question. Interacting with the stellar faculty and eager young scientists was exciting on every level. The facilities and questions were great, but the people are what make the course special.
123	Getting to know so many interesting students - and faculty
124	engaging with so many intelligent and stimulating faculty and TAs.
125	Informative lectures and hands-on experience. New collaborations were established
126	Overall it was a fantastic experience. Probably the sense of excitement from science at the interface between cell biology and physics was the most important take-home message. Also a lot of my peers from the course are now faculty members and it is nice to have strong connections with people from various fields.
127	great community and interdisciplinarity
128	Interacting with other students and faculty
129	Meeting amazing scientists and having extremely deep, stimulating, and insightful discussions with them while swimming and drinking beer.
130	Interactions between scientists lead to life-long scientific colleagues/ collaborators.
131	To see how easy it was (with a bit of luck and rigor) to pull out samples from the natural environment and subject them to scientific scrutiny.
132	learning how to think in the way biologists do
133	Enthusiasm of and interaction with the people taking part!
134	The intensely collaborative atmosphere was so exciting, and energized me in my subsequent dissertation research.