

**Summary of Responses to Final Questions posed to NIH-NSF Southern California Bioinformatics Summer Institute (held at California State University, Los Angeles) Interns in summers 2003-2006.** There were 49 interns who provided responses over the 4-year period (13 in 2003, 10 in 2004, 14 in 2005, and 12 in 2006). Items are listed in rank order for the complete 4-year time period. The number of interns who identified each item is indicated to the left of the item. The years that an item was identified and the rank (average for ties) for the item that year are indicated in parentheses following the items. Totals may exceed 49) if some interns entered several responses to a question. Interesting direct quotes or paraphrased comments are included following each item.

- 1) **What part of your involvement in the SoCal BSI Program met or exceeded your expectations? Please explain why or how.**

**35 Didactic training** (2003/1, 2004/1, 2005/2, 2006/1) – biology training, “good programming review though seemed like lots of work at the time”, good background to project, “learned a lot, though not used in my project”, phylogenetics and probability workshops, interesting and I learned a lot, informative and interesting, introduction to various tools useful, programming projects helped us understand the correlation between computer science and biology, great overview of biological sections and basic intro to programming, exposure to new discipline, probability and statistics and microarray workshops, variety of experts teach each workshop, broad coverage, but could have used more time on probability and statistics, gives good idea about breath of required knowledge, large # of topics/broad introduction, computational portion, Warter-Perez’s and Momand’s presentations, project where students worked independently on project and then pooled data, faculty understand the lack of bioinformatics background and fill in the blanks, review of all important material, biology portion, limited background in bioinformatics, so really useful, computer section great, gave a good idea about available bioinformatics tools

**22 Overall experience at internship site** (2003/5.5, 2004/4, 2005/1, 2006/2) – enjoyed, liked people and location, real research project, several people at one site helps build network, met great people, real project – like in grad school, helpful for career – confirmed bioinformatics is an appropriate career path, clear expectations from mentor, went well, good experience with site and will stay in the Fall, well organized projects for interns, very individual and exploratory project, best internship experience so far, develop skills of professional scientist, learned biology and how to be a scientist, working as part of a lab on an ongoing research project, great opportunity, hands on experience

**17 Overall program and its organization** (2003/2.5, 2004/2.5, 2005/3, 2006/7.5) – “great experience”, learned a lot and met great people, “great idea to have this institute”, very impressive, good relationship between the didactic and research phases, better than most programs, knew schedule and expectations ahead of time, having an internship versus just didactic instruction, learned more than thought would, “people were really nice” – Jennifer and PIs did a great job, personal attention, everyone helpful, very well planned program, liked didactic followed by internship with the Friday follow ups, Jackie was “on top of things”, wonderful, very helpful, very helpful ahead of time

**17 Didactic faculty/PIs** (2003/2.5, 2004/2.5, 2005/5.5, 2006/4) – extremely patient, supportive, helpful, really liked instructors, programming instruction began with basics and built from there – statistics workshop started that way, but suddenly the presentation level was well above my understanding, friendly and helpful, interest in interns, extremely helpful and caring, very supportive and easy to talk to, interactions – chance to get to know faculty personally vs. professionally, Dr. Johnston, women faculty good role models, approachable professors, friendly and “took care of us”

**13 Friday professional development sessions** (2003/4, 2004/6.5, 2005/5.5, 2006/3) – pulled things together, mentors’ talks gave broad view of the field, very useful, very helpful for professional development, “helped us to understand that “problems” are normal”, ability to talk with research mentors at

their presentations/other events, lunch before presentations made talks more interesting, speaker lunches, “massively improved” presentation skills, practice on presentation skills

**8 Research mentors** (2003/7, 2004/5, 2005/8.5) – impressed with quality, mentors at ViaLogy were helpful and supportive, very helpful and spent time with us, very positive relationship with mentor, mentor helpful and approachable, good experience with mentor, mentor helpful and very accessible

**8 Choice of internship site** (2003/5.5, 2004/6.5, 2005/13, 2006/7.5) - variety and diversity of sites

**5 Development of friends/professional network** (2003/8.5, 2004/10, 2005/8.5) – other interns through didactic training, program PIs and mentors

**4 Interns** (2003/11, 2005/5.5) – diverse, from across nation, got exposure to other work sites through other interns

**3 Focus on Presentation skills** (2005/5.5) – saw peers improve substantially

**3 Beach party** (2003/8.5, 2004/10)– fun, bonding experience, received career counseling in informal environment

**2 Evaluation of the program** (2003/11, 2005/13) – nice to see previous evaluations on website

**2 “Real world experience”** (2004/10, 2005/13)

**2 Program intensity** (2005/13, 2006/7.5) – helps improve on weaknesses, amount of material learned in program

**2 Individual Attention throughout Program** (2006/4.5)

**1 Second Year Students** (2006/7.5)

**1 Car pools to internship sites** (2005/13)

**1 Compensation** (2003/11) – very good relative to other programs

**2) What part of your involvement in the SoCal BSI Program disappointed you? Please explain your response and/or suggest ways to improve the program with respect to the issue that you have identified.**

**29 Didactic training** – (2003/1, 2004/1, 2005/2, 2006/1) assumed a certain background beyond what was reflected in the program application, so I struggled, biology lectures were not enough to bring me up to speed on this topic, not enough time to reflect on/internalize concepts from workshops, programming, microarray and statistics workshops need improvement, statistics workshop could have more practical, specific examples and have applied as well as theoretical information, would be useful to have more coverage of analysis of massive microarray data sets, could have used even more probability training, didactic phase not directly related to internship (only literature searches and NCBI databases), could increase in length – need more time to internalize concepts (ex. Microarrays, programming, statistics), short time to understand complex concepts, redundant if intern has prior bioinformatics background and programming section could be extended, programming phase not general enough, split into 2 sessions based on previous background, assignments should be more challenging, more statistics, better step-by-step directions, need more database training, long days and sometimes workshops need info from later in didactic phase, not

much depth to topics, more difficult than expected due to specific background of student, some instructors were not as prepared as they could be, some curriculum was too basic for the students, too much content and better instructions needed for microarray presentation, also walk around to help students understand project and include how related to “big picture”, divide up computer scientists and biologists for some sessions, statistics presentation was rushed, phylogenetics presentation was not a real workshop, cover more than one gene browser, diversity of backgrounds required review of basic topics, sometimes spent time on simple topics rather than the complex topics, room used was “cold” (people too far away), should encourage people to work together on assignments and/or encourage competition among interns on programming project, statistics and computer section, nothing new for some students so should be able to “opt out” (n=2), topics covered too quickly, should “jump start” writing assignment during workshops, should have a more advanced training opportunity, experienced frustrations getting answers to some workshop assignments, lack of depth, excessive homework that was not useful

**17 Friday professional development sessions** (2003/6, 2004/4.5, 2005/1, 2006/3) – unexpected obligations for Fridays during the internship put extra strain on my time, move these to Wednesday so we get a break in the middle of the week, should not assume that interns are all naïve undergraduates, harsh criticism, critiques largely negative – please add some positive comments, disorganized and often ran long, intense and took away from internship, harsh instead of constructive and almost always ran long, overly critical generally, but particularly toward women, need computational faculty there to provide appropriate feedback, some questions during presentations “indicate a lack of focus on the part of the listeners”, would have liked more work on resumes and follow up to submission, requirement to be both at the research site and CSLA on Fridays, sessions long and tedious

**13 Internship project** (2003/9.5, 2004/4.5, 2005/3, 2006/2) - did not get to use math or statistics background in project, thought I would get experience in programming, but didn't – did not allow desired professional development, descriptions misleading, extent of prior programming experience, some mentors did not offer help but waited for requests from intern, availability of mentors, not really a research project, more a programming project that does not clearly address a biological project, expected to have a mix of science and programming, but did all programming, matching to mentor, should be longer (n=3)

**12 Arrangements for out of town students/housing** (2003/3, 2004/7, 2005/4, 2006/4.5)– no information about what to bring until ~1 week before program began, not clear that program was actually set up, housing arrangements - very stressful to move around so much, apartments without linens, dishes, etc. are problem if you arrive by plane, only 6 weeks of guaranteed housing stressful, interns tended to interact in “in-state versus out-of-state” cohorts, last minute changes, expensive, no Internet access, not friendly to out of town people – transportation a problem, no Internet access in campus housing, no Internet access, bugs in units, outlets do not work, dorms were horrible

**8 Internship organization** (2003/6, 2004/2) – lack of support/organization at site, had to switch projects and lost time, “at this point in our careers we need more direction to get anything done”, felt wasted several weeks, “internship was not well planned, in contrast to the didactic phase”, “I wasted 2 weeks reading papers instead of doing actual work”, more project options, would have been nice to study up on project ahead, i.e. select project before program begins, “odd” that some research sites were not set up until the last minute, communication between research mentors and PIs needs improvement, mentor was “very busy person” so intern needed more guidance than received, only met with mentor a few times – need critiques on a regular basis, no real career contacts made, BSI PIs focused on final presentation while mentors focused on actual project, as if there were “two completely different groups involved” – need better communication between mentors and PIs

- 7 Commute to internship site** (2003/9.5, 2004/7, 2005/7, 2006/4.5)– 2 hour commute each way was a burden, lack of transportation for out of town students, ½ at worksite versus CSLA a problem, not easy on public transportation, not clearly disclosed in program advertisements, lack of reimbursement, imposed a financial and time burden
- 5 Internship length** (2003/9.5, 2004/3) – longer would be better, “7 weeks is too short to accomplish anything significant” – would have liked time to explore the biological significance of the project, should be longer
- 5 Stipend payments** (2003/3, 2006/7.5) – variability week to week in amounts received (n=2), direct deposit (for out of town students) would be helpful, pay schedule erratic (n=2)
- 4 Process for choice of internship sites** (2003/3) – hard to tell what each site had to offer, some inaccuracy in information supplied by program faculty, need time to visit internship sites, “I felt targeted due to prior experience into something I was not really interested in.” – maybe selection process happened too quickly, maybe have a chance to talk directly to mentors before assignment, need more information/details, need more detailed descriptions of projects
- 3 Team design of internships** (2003/6) - Competition among interns at worksite – “I versus we” attitude, but then the team process worked when the problem got more difficult, teaming on a programming project can be difficult, I didn’t get along with the other intern, perhaps we need help in dividing up the work/mentors need help in developing the teams
- 3 Selection criteria for interns** (2003/13, 2005/7) – program assumed rich bioinformatics background not reflected in program application or intern selection criteria, produced uneven learning environment, poor work ethic/attitude
- 2 University visits** (2003/9.5) – need more time to prepare, should get to choose versus being assigned
- 2 Favoritism by program PIs** (2005/7)
- 1 Adapting to American culture** (2003/13)– appreciated how open people in the company were about their feelings
- 1 Lack of coverage in program office** (2003/13) – please return calls in 24 hours or have message explaining office coverage
- 1 Disorganized Schedule** (2005/7) – often last minute changes
- 1 Orientation of Program** (2005/7) – advertised as CS, but really biology
- 1 Nothing** (2004/7) - “pleasantly surprised”, “I’m usually critical about everything.”
- 1 Social Activities** (2006/7.5) – more should be arranged through Institute
- 1 Lack of Contact between Acceptance and Start of Program** (2006/7.5)
- 1 Final Presentation Rubric should be used prior to Final Presentation** (2006/7.5)

3) **Would you recommend to a colleague that they accept an intern in the SoCal BSI Program? Please answer either NO, YES, or YES WITH RESERVATIONS. Please explain your response. (One intern gave two answers.)**

- 2 **NO**, perceives problems for women, for someone with little Biology background
- 31 **YES**, great for computer science people looking for applications in the sciences, particularly good if you want to learn about bioinformatics careers (4 interns say this), to determine future career path or already know you want a career in bioinformatics, “great program and experiences”, “need hands on experience for the real world”, gives broad background in bioinformatics and biostatistics (2 interns note this), bioinformatics cannot be taught in solely a didactic fashion, most of my friends have the appropriate background and this gives a good summer “real world” experience in a company, professional network development, practical aspects of program, good program and helped me to decide not to go into bioinformatics as a career, can use various aspects of program on resume, paid internship is a plus, good general intro to field, for programmer with some Biology background and because internship matches pairs, good experience, learn a lot, lots of interaction between interns/Pis, great experience at end of an undergraduate program, amount of didactic training and the internship, “good program to get exposure to field”, but hard without the appropriate programming experience, good opportunity to get basic overview of bioinformatics and to apply knowledge in a workplace environment, definitely good for undergraduates and those who know how to ask for help, “definitely”, “great experience” overall, everyone got more out of the program than expected, overall a good experience that allowed social, personal and intellectual growth, good research experience and stipend, overall good experience and very diverse internships, very pleased with overall experience, “how much better could it get”, if interested in the field and had some research experience, overall positive experience
- 17 **YES WITH RESERVATIONS**, due to identified program weaknesses, but would definitely recommend mentor who defined project at appropriate level, if you had a car and had never been to LA (to experience the city), but not until ~3<sup>rd</sup> year when all problems have been worked out, would not be appropriate without prior programming experience or if have already completed a significant bioinformatics project, need background in both computer science and biology, good for people with prior programming experience, will receive general versus specific background, do not count on getting desired internship, good for basic bioinformatics background, good for someone without much background in bioinformatics, if friend had an interest in bioinformatics and was at the end of an undergraduate program or was undecided about career, enjoyed challenges of a new city, but others might not, need to look at website and make sure that the 10 week curriculum meets individual goals, housing poor and had to rely on others for transportation

**4) What would you suggest would be a valuable second year experience for returning So Cal BSI students?**

**9 Current Format OK**

**1 Continue 1<sup>st</sup> Year Project**

**1 More Advanced Didactic Phase**

**1 Add Writing Assignment**

**1 No Comment**

**1 Pair 2<sup>nd</sup> year Student with 1<sup>st</sup> Year Student – provide guidance on research project**

**1 Have 2<sup>nd</sup> Year Students Help out for ~1/2 hour each day in the Didactic Phase**

**5) Please rate on a scale of 1 to 10 the usefulness of the didactic phase of the institute, with 1 being essential to your success in the research phase and 10 being completely unimportant to your success in the research phase of the institute.**

**Mean = 4.2 (1-9)**

**6) Please rate on a scale of 1 to 10 the usefulness of the professional development phase of the institute, with 1 being essential to your success in the overall institute's program and 10 being completely unimportant to your success in the overall institute's program.**

**Mean = 2.4 (1-6)**

**7) Why were you attracted to a program offering you a summer bioinformatics internship?**

**3 Wants to Combine Knowledge of CS and Biology**

**2 Wanted to Decide about Appropriateness of Research Career**

**1 Plans to Pursue a PhD in the Field**

**1 Professional in Field Suggested It**

**1 Degree Program Requires, but Does Not Provide Opportunities**

**1 Wanted a Research Experience in Biology**

**1 Bioinformatics is an "Up and Coming Field"**

**1 Bioinformatics Combines Medicine and Scientific Research**

**8) Why did you choose the So Cal BSI program versus other summer bioinformatics programs?**

- 5 Wide Range of Internships** – chance to work at Cal Tech (n=2)
- 3 Professor/Mentor Recommended**
- 3 Didactic Phase**
- 2 Location**
- 1 Open to Individuals with Diverse Backgrounds**
- 1 Only One Aware Of**
- 1 Classmate Recommended Program**

**9) Overall, do you feel that you achieved your goals as related to this Institute?**

- 12 Yes**

**10) How often should dinners be formally organized and attended by the institute PIs?**

- 9 OK as is** – maybe change to every other week, include buffets, perhaps change to Friday, start later due to commute (n=5), should be held at more central site (n=4)
- 1 Prefer Lunches**
- 1 Should be Optional** – difficult with people scattered around LA
- 1 Too Frequent**

**11) Do you have any other comments about the SoCal BSI Program that you would like to make at this time?**

- Hope the program continues forever
- Nice to be able to use the 2<sup>nd</sup> year students as role models for development of presentation
- Yahoo group should move to Institute website
- Post assignments on Institute's website
- Trips to other campuses were great idea
- Appreciate the effort by all So Cal BSI staff
- Overall an excellent program
- Beach party was really fun
- Great program
- Liked the dorms
- Would be nice to have more students in the program
- "great program"
- 2<sup>nd</sup> year students "took care of us"
- "wonderful experience"
- "all PIs did all they could do for us"
- very happy with whole "real life" experience despite "challenges"
- I wasn't really sure what to expect at the beginning of the program.

- In the end, satisfied with internship experience (student did mention internship as weakness).
- Logical order of events (for the program), but could be expanded timeline
- “Reinforced my goal to work in the bioinformatics industry.”
- perhaps need to select more students from across the nation
- some interns might do better with a more structured first internship
- it would be nice to get to visit all internship sites before selecting one
- “overall a really good program”
- “Really good...really glad I did it, put together really well”
- be more understanding about unplanned events that impact attendance
- issues with transcripts
- interns need sheet with contact information/required documents prior to beginning of institute
- program should ease certain issues at worksites
- found out that bioinformatics is not for them
- “I had a really good time.”
- some expenses not reimbursed
- “Really great program.”
- transportation an issue
- some projects seemed like straight CS versus bioinformatics/research projects
- “great experience and obviously helped me”
- now plan to make a career of bioinformatics
- networking was good
- need better organization and communication with CSLA facilities
- “I think the program is really cool.”
- maybe more social events needed to help interns make personal contacts
- do not use computer room if computers are not needed for workshops
- presentation critiques on Fridays “harsh, but useful”, I’d never had this before
- social activities helped to “break the ice”
- good to mix grads and undergrads
- level of class assignments appropriate
- greater diversity of interns from across nation would be good
- “organizational skills training in the didactic phase was not appropriate”
- did not like required research paper review, did not have appropriate background for assignment
- some lectures were not presented with much enthusiasm (ex. Phylogenetics)
- exercise for applying to graduate school was not well organized and was not appropriate for graduate students, should be broader (i.e. include companies), we needed better guidelines for the assignment, and there was no follow up to the assignment
- perhaps more social activities with PIs?
- do final presentations all on Thursday and leave Friday for exit interviews and reception, less stressful
- the structure of the research phase did not force interactions – “your place in the lab was not clear” and the “free environment” also caused problems
- “fun” based on social interactions with peers and faculty
- new city was reason I came
- “I’d do it again. I’d like to come back.”
- would have liked more information during the application and decision making process
- “I heard that campus housing was great.”
- thought that mentor felt that he was not spending enough time with me – management did not understand how time consuming it is to be a mentor
- project was not well thought out in beginning