**Interview Key Points**

**From Job Description**

* Big Data Analytics
* Highly Collaborative Teams
* Documentation and Key Support
  + OSU- Java and Python Report and metrics to Dean
* Establish and Maintain Standards
  + Current Job Built new System to organize site
* You are: passionate about open-source software and transparent sharing of information
* Enthusiastic about working in a team that finds quantitative insights in complex data and develops interactive tools to enable clinicians and researchers to understand cancer
* Experienced in thinking analytically and developing software tool and
* An organized self-starter who enjoys creative freedom in solving computational challenges.
* Critical thinker, with willingness and ability to learn new subject areas.
* Ability to effectively translate and convey expertise across domains.

**Points**

* Really like the focus and growth and understanding of the need to build this program
* Ability to manage and understand tremendous amounts of data

**About Me**

* Passion and Career Goals
* Passionate about continued learning (especially computational biology)
* Examples of Skills
  + Give me a task to do
  + Let me Show my code
* Collaboration
  + Divvy
  + ShareShare
  + Wishlist
* Passionate about UI design and web services
* Like to simplify and understand and work with data
  + OSU
    - Old
      * 2,191 file
      * 434 folders
      * 503mb on disk
    - New
      * 256 file
      * 36 folders
      * 135 mb on disk
    - Reduction
      * 12% files
      * 8% folders
      * 26% of size mb
  + NE/RHP

**Story to draw on**

* Taught Radiation Biology no previous college biology
  + STAR
  + Situation
    - Got to teach Radiation Biology no previous college biology
* Wishlist
* Shareshare
* File Share
* Radiation Physics Thesis
* Departmental Analysis
  + Java Python
  + Cross Department
  + Fixed Staff Drive
* New tools for graphic designers
  + Put budget together
  + Reasoning
  + Sent to dean
  + Approved
  + Started marketing and graphic design office
* Re did OSU Staff Drive

**Questions**

* Hiring time frame
* Day to day
* Current projects
* Relation to other faculty research

**OHSU Computational Biology**

**About**

* Our team supports OHSU researchers with their discovery-based original research projects, by providing analytics and resources that assist with locating, processing and analyzing large amounts of data. In addition, the goal of the department is to build a program that promotes collaboration in and outside of the institution and breaks down the traditional silo's found in academia.

**Program Overview**

Goals

* OHSU will lead the next generation of genomically guided therapies and early detection by discovering novel data-driven genotype/phenotype association inferred from large-scale analytics, and translating them to benefit clinical care. To enable this vision, the computational biology program will be guided by the following priorities:
  + Demonstrate benefit to patients through advances in big data analytics
  + Enable scientific goals of cross-departmental programs/projects
  + Establish OHSU as a world leader in computational biology research

Strategies

* In order to be an effective team we have implemented the following strategic goals:
  + **Move OHSU into the big data era through organizational structures, systems, and values fostering goal-directed team science**
  + Engage researchers to continuously build on work of colleagues around priority projects with high value-add across multiple basic science projects
  + Initial build focus on integrative data analysis (including omics and imaging data) to predict disease phenotypes from clinical and genetic information
  + Future build focus on early detection
  + Develop strategic partnerships with world-leading efforts in priority areas

Objectives

* The overall objectives for the team are as follows
  + Align existing efforts through standardization of tools and systems
  + Build expertise in advanced probabilistic inference methods for integrative data analysis
  + Build expertise in high-level, team oriented software development
  + Create a transparent, accessible body of data inter-operable with large-scale public data sources
  + Advance research goals across multiple basic science initiatives

**Collaboration with Intel**

**So, what is computational biology?**

PS: Computational biology uses mathematical equations and numeric computation to answer fundamental biological questions. Computational biology touches every discipline of biology, not just genomics or molecular dynamics. Neurobiology is distinctly about the brain. Cancer biology is about cancer. Computational biology could be about either of these and is routinely applied in the study of every biological process.

**How is it changing the field of biology?**

JG: You can only learn what you can measure. Now we have access to measurement technologies and data accumulation technologies that are really remarkable, and they’re generating a tremendous amount of data. We now have a wealth of information: clinical data, personal data, genomic data. All of these are giving us amounts of information that even five years ago was unimaginable.

In parallel with this, we have the computational ability to actually manage that. Our ability to store data has increased dramatically, so we are now able to acquire, store and compute on terabytes of data from individuals. In many cases, treatments will be personalized based on computational analyses of the data we’re now generating. Computational biology is going to affect everybody: the clinical enterprise, the biological enterprise, the health care management enterprise.

It’s important to remember, though, that data are not knowledge. Data are just bits in the computer. One of the hallmarks of successful academic institutions of the future will be having people who can interact with that data and convert it into knowledge.

Here’s another perspective on it. I served on an Institute of Medicine review committee this past year in which we looked at various scientific missteps: people who had analyzed data in ways that were unfortunate, if not unethical. If you don’t have enough faculty members with expertise in this area, then it becomes possible for small groups of people to do things with data that are inappropriate. Institutions can take major reputational and financial hits because of those missteps. These things can be avoided by having enough faculty who are skilled in computational biology to provide internal quality control. If we want to participate in this big data science, we can’t play at a low level.

**What’s the history of computational biology at OHSU?**

PS: OHSU has made a good start on it, but the university needs to strengthen its abilities. Part of the challenge over the last 10 to 15 years is that there haven’t been enough faculty, a critical mass if you will, to make the current computational biology faculty feel like they have a home. They need colleagues whom they can talk to and who understand what they’re talking about.

**Tell me about the program, what it will entail.**

PS: Because computational biology touches every one of the basic science departments, each department needs to have people who do computational biology on their faculty. Just like any program, 10 to 15 is a minimal critical mass. We have about 10 faculty here already. Our goal is to add another 5 to 10 in the next few years. We’re also recruiting a program director.

**What will the faculty mix look like?**

PS: Let’s say we hire six. I envision two would have very strong computer science backgrounds, say a Ph.D. in computer science. They’d develop new algorithms that have biological purposes. Another two could have really strong statistical backgrounds such as statistics or mathematics, and they’d develop statistical or technology approaches to handling biological problems. The last two might have a traditional biology background, but their main interests would be using computational analyses to solve biological questions.

**How will traditional biologists benefit from having computational biologists in their department?**

PS: Computational biologists will bring knowledge about what is happening in computational biology into the departments. They’ll know what approaches are out there. They can help the faculty in the departments find the right way. Or, say they’re in a seminar, and they hear about a piece of research and think: that would really benefit from this type of computational approach and XYZ person is doing that. They bring methods that the more traditional biologists and clinicians aren’t experienced with and may not know about.

**How does building this faculty capacity fit into the Intel collaboration?**

PS: To make that relationship with Intel work, we really need these computational biology faculty members. The opportunity at OHSU is really quite exciting. There are a lot of components of computational biology that are very computing-intensive. Many problems need lots of computers, banks and banks of computers. My group uses about 45 servers, but some groups have 500 servers or 5,000 servers. The more you have, the quicker you can solve the thing you’re working on. So what Intel brings is expertise in server design, but also thinking about how to deploy those servers more efficiently and effectively and how to re-architect the server so it performs the analyses we want to do.

We have the opportunity to help Intel make the computers of tomorrow, ones that are best suited for solving our problems. What we get in exchange are improvements in software, hardware and the ability to leverage that into other opportunities. Hopefully, it’s a win-win for both of us in a lot of different ways.

JG: If you want to be state of the art in your science, you have to be state of the art in your measurement technologies and computational infrastructure. That requires private sector collaborations. If we know what’s coming down the road in terms of those technologies, that’s a huge advantage. We will gain that advantage from our industrial partnerships.

**What about the education piece of the program?**

PS: Eventually, it will be a graduate program in quantitative biology. It will primarily feed faculty in the Department of Biomedical Engineering, the OCSSB, the current computational biology faculty and a number of other departments who have faculty doing quantitative analysis. It goes beyond the traditional PMCB student who has had, at best, a couple semesters of college calculus and no computer programming experience, to speak of. The goal is to bring in folks who have an undergraduate degree in physics, computer science and/or mathematics. Folks who are quantitatively minded and who are looking for a challenge. We want the folks who’d like to use their skillset for something other than making money on Wall Street!

JG: We need to train people that we, as an institution, and that other institutions will need in the future. There is a lot of angst right now about whether we’re training too many scientists. Well, we’re not training too many of this kind of scientist. We’re training too few of them, in my opinion. We need to have a vibrant program in that area. When you think about recruiting quality computational biology faculty, they’re going to want to have a quality graduate program with which to interact. Those go together. We have to be building them both. They have to grow together. And they need to grow really fast. We need them now.

**What would you like to see accomplished five years from now?**

JG: I want us to have a vibrant, world-class quantitative biology graduate program and have an additional 10 quantitative biology faculty members. I would like to see computational biology a central part of every major program at OHSU. I could envision a future where as many as a third of OHSU faculty have significant computational skills. It will revolutionize the way we approach biomedicine.