

# Individual Development Plan for Postdoctoral Scholars

Name of Postdoctoral Scholar or Fellow: \_\_\_\_\_

Start date of internship: \_\_\_\_\_

Department: \_\_\_\_\_

**Signed by:**

\_\_\_\_\_

Postdoctoral scholar or fellow

\_\_\_\_\_

date

\_\_\_\_\_

Mentor (name in print + OSU ID)

\_\_\_\_\_

Mentor (sign)

date

\_\_\_\_\_

\_\_\_\_\_

Mentor (if more than one – print and sign)

\_\_\_\_\_

date

**Approved by:**

\_\_\_\_\_

Office of Postdoctoral Programs

\_\_\_\_\_

date

**Note: 15% of the Postdoctoral Scholar's time should be devoted to professional development activities that develop core competencies outside of regular research responsibilities.**

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## **A. Career Goals (to be filled out by the postdoc)**

- What are your short-term career goals? Describe your time line for achieving them?
  - Become proficient in the statistical and computational skills associated with analyzing large metagenomic datasets (ongoing process).
  - Gain experience in standard biological software development practices using R, Python, and Perl (ongoing).
  - Help develop and teach several lectures or a module at the undergraduate/graduate level to improve my teaching skills. (Early next year)
  - Mentor Graduate students and undergraduates
    - There is a significant amount of team science that occurs in the Sharpton lab, which provides me an excellent opportunity to share my expertise with both graduate students and undergraduates.
  - Write for Postdoctoral fellowship (NIH) (Spring and Fall 2015 continuing as necessary until obtained).
  - Serve on a search committee if possible.
  - Present ongoing work at Keystone Gut Microbiota Modulation of Host Physiology or equivalent meeting (winter 2016).
  - Obtain transitional funding (NIH K series award, Burroughs Wellcome Fund CASI award, etc.) (Apply middle - end of second year).
  
- What are your long-term career goals? Describe your time line for achieving them?
  - Obtain an academic research/teaching appointment. Ideally, the appointment would be a tenure track position with 80-90% research and 10-20% teaching at a mid-size public university.
  - Alternatively, a position in industry would be another option. A large company such as Nanostring, Illumina, or Merck would be optimal. Also, companies interested in understanding the interaction between host and microbiome such as, Second Genome or Osel would be satisfactory.
  - I believe it will take at least two years to produce the necessary data, publications and funding to be competitive in the current job market. I anticipate at least three years will be needed to secure employment.
  
- When will you begin a job search? If you do not know, estimate. If you have already begun a search, briefly describe
  - Given the highly competitive nature of academic appointments I will begin looking for a position after the publication of two first author papers in reputable journals, and a successful acquisition of a postdoctoral fellowship.
  - It is estimated that these conditions will be met near the end of year two.

## **B. Research Project(s) (to be filled out by the postdoc and validated by the mentor(s))**

- Briefly describe the aims and experimental approaches of your current research project(s)
  - Development of the zebrafish model for high-throughput metagenomic profiling.
    - Aim 1. Quantify the structure and inter-individual variability of the zebrafish metagenome
    - Aim 2. Describe the temporal variability of the zebrafish metagenome
    - Aim 3. Examine the resilience of the metagenome when perturbed by external stimuli
  - For these aims I will generate shotgun metagenomes for each group, and analyze the data using a variety of publically available tools for analysis of shotgun metagenomes.
  - Development of a tree recursion tools for the analysis of microbial communities
    - Aim 1. Develop an algorithm to traverse and collapse phylogenetic trees in R.
    - Aim 2. Use algorithm to analyze large publicly available 16 datasets and assess evolutionary relationships between hosts and their microbiota.
    - Aim 3. Use publically available metagenomic data to examine genes that may share tree topology with there vertebrate hosts.
  - These tools will be built in R in collaboration with a graduate student in the lab (Nicole). Resulting custom analyses will be conducted using the algorithm I create and custom scripts created by Nicole.

## **C. Expectations for Contribution to Research Project(s) (to be filled out by the mentor(s) and validated by the postdoc)**

- Conduct research on two major projects which will ultimately lead to publications:
  - Establish zebrafish as a model for high-throughput microbiome investigations in collaboration with the Kent lab.
    - Generate molecular sequence data
    - Conduct bioinformatic investigations of that data
    - Statistically analyze the results
    - Lead the development of the resulting manuscript
  - Develop bioinformatic software that measures the distribution of monophyletic clades of microbes across microbiome samples
    - Work in collaboration with other lab members on this project
    - Produce open-source analytical software
    - Apply to various large-scale microbiome data sets
    - Generate and apply additional scripts and tools needed to assist in the analysis and summary of the data

- Participate in the development of the resulting manuscript
- Participate in team science activities
  - Assist in the analysis of data generated or obtained by the lab for various lab projects, which may include
    - Annotation and analysis of metagenomes from a mouse model of inflammatory bowel disease or glucose intolerance
    - Quantification of the structure and diversity of microbiome structure from 16S data
    - Generate scripts, download databases, and manage virtual resources relevant to laboratory computational research needs
  - Contribute to group discussions, lab meetings, and coding sessions
  - Train graduate students in the molecular biology techniques needed to generate nucleic acid sequence data
- Communicate research findings
  - Publish research in open-access scientific journals
  - Release software in open-access and public repositories (e.g., github)
  - Communicate research (i.e., talks or posters) at local, domestic, or international meetings
- Contribute to efforts to obtain additional research funding
  - Submit postdoctoral research fellowship applications
  - Assist in grant proposal development, especially generation and analysis of preliminary data
- Expand competency in bioinformatics research
  - Conduct research in this field (see above)
  - Attend a workshop or audit a course in quantitation, statistics or computer science/programming

**D. Professional Development Plan** (to be filled out by the postdoc and mentor(s) in collaboration)

*For more information and links to resources, download the complete [Core Competencies](#) document.*

Competency	Goals (for each goal, think about how you will achieve it? By which mechanism?)	Expectations of postdoc (including what does the postdoc expect as outcomes?)	Responsibilities of mentor(s)
<p>Discipline specific conceptual knowledge (gain understanding of a new theory or concept, develop fluency with respect to a methodology/method of analysis, learn how to use of a new computational tool)</p>	<ol style="list-style-type: none"> <li>1. Improve fluency in evolutionary biology specifically as it applies to microbial phylogenetics.</li> <li>2. Increase knowledge of statistical methods involved in the analysis of large datasets (including Bayesian, multidimensional scaling, PCA, PCOA and NDMS, etc.)</li> <li>3. Expand fundamental knowledge of bioinformatics and biocomputing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Audit a graduate statistics course (stat 511/512 or equivalent)</li> <li>2. Take intermediate programming training module (fall 2014)</li> <li>3. Need time to read relevant literature for bioinformatics and phylogenetics.</li> </ol>	<ol style="list-style-type: none"> <li>1. Support attendance in bioinformatics training modules, workshops, or courses</li> <li>2. Provide hands on research opportunities and side-by-side training in this research area</li> <li>3. Organize collective discussions of bioinformatic literature.</li> <li>4. Provide exposure in running a virtual lab, e.g., system administration.</li> </ol>
<p>Research skill development (includes experimental design, new measurement or analysis technique, data analysis, peer review process)</p>	<ol style="list-style-type: none"> <li>1. Become proficient in the construction and maintenance of algorithms designed for analysis of large datasets</li> <li>2. Develop skills necessary to code efficiently in Perl, python and R.</li> <li>3. Gain experience analyzing metagenomic data using custom as well as widely available tools.</li> </ol>	<ol style="list-style-type: none"> <li>1. Guidance and feedback from my mentor on the quality and readability of my code.</li> <li>2. Time to devote to learning and exploring new programming languages.</li> <li>3. Access to tools and computing infrastructure necessary to gain experience in metagenomic analysis.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide critical code reviews</li> <li>2. Provide weekly one-on-one meetings to discuss research objectives, challenges and guidance</li> <li>3. Devote time to formal and impromptu training sessions in programming and system administration</li> </ol>

		4. Construction of a publically available git repository for my code.	
Communication skills (includes writing publications and grants, CV, teaching portfolio, job interview skill, poster and oral presentations, teaching, networking)	<ol style="list-style-type: none"> <li>1. Develop presentation skills, particularly for longer presentations (30-60m).</li> <li>2. Develop a job talk.</li> <li>3. Practice writing grants.</li> <li>4. Grow network in the field.</li> </ol>	<ol style="list-style-type: none"> <li>1. Opportunities to present at lab, department and conference settings,</li> <li>2. Input and direction from mentor during the development of my job talk.</li> <li>3. Opportunities and time to write for grants and fellowships and input on my drafts.</li> <li>4. Opportunities to contribute significantly to the writing in publications.</li> <li>5. Help with introductions and initiations of collaborations in and outside of OSU.</li> <li>6. Will seek out and participate in workshops at OSU designed to develop the skills outlined above.</li> <li>7. Ideally I would present my work at one or two national/international conferences.</li> <li>8. Publication of 2, or more, strong first author publications in reputable journals.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide opportunities to communicate work (e.g., lab meetings, nomination for local talks, support for conference travel)</li> <li>2. Provide thorough and critical reviews of written documents (e.g., manuscripts, fellowship applications)</li> <li>3. Sponsor fellowship applications, include crafting of written statements</li> <li>4. Provide guidance and feedback on presentations, especially for practice talks for formal presentations (e.g., job talk)</li> <li>5. Encourage and facilitate professional networking of fellow.</li> </ol>
Professionalism (includes interpersonal relationships,	1. Serve on a search committee for a faculty position	1. Help in identification of opportunities on-campus for service and development.	1. Provide and encourage mentorship opportunities (e.g.,

<p>multicultural competency, institutional obligations, service to institution and society)</p>	<ol style="list-style-type: none"> <li>2. Become involved in on-campus organizations for postdocs and graduate students.</li> <li>3. Engage in mentorship of to undergraduates in closely related fields</li> </ol>	<ol style="list-style-type: none"> <li>2. Time to dedicate to mentorship of graduate students and undergraduates, in and outside of the lab.</li> <li>3. Seek out opportunities to build collaborations and relationships with postdocs and faculty on and off OSU campus.</li> </ol>	<p>graduate and undergraduate students)</p> <ol style="list-style-type: none"> <li>2. Provide advice and feedback in mentorship efficacy</li> <li>3. Support efforts to provide community service</li> </ol>
<p>Leadership and management skills (includes staff and project management, time management, budget preparation and management, strategic planning, serving as mentor and role model, running meetings, delegating responsibilities)</p>	<ol style="list-style-type: none"> <li>1. Learn how to write grant and lab budgets.</li> <li>2. Acquire skills necessary to mentor graduate students and undergraduates with respect to time management, research progress, effective motivation practices, career pathways, etc.</li> <li>3. Gain skills to effectively manage a lab with regard to management of research projects, running lab meetings, selecting lab personnel, and management of collaborations.</li> </ol>	<ol style="list-style-type: none"> <li>1. Seek out workshops on campus for transition to faculty positions.</li> <li>2. Attend Grant writing workshops on-campus.</li> <li>3. Engage in mentorship of graduate students.</li> <li>4. Periodically lead lab meetings and paper discussions.</li> <li>5. Seek out workshops and modules on effective time and personnel management.</li> </ol>	<ol style="list-style-type: none"> <li>1. Include fellow in grant writing process, from idea formulation to narrative construction, to budgetary consideration. Provide fellow with opportunities to make direct contributions</li> <li>2. Encourage and support attendance in professional development workshops</li> <li>3. Train fellow in virtual lab management</li> </ol>
<p>Responsible conduct of research (includes data sharing and ownership, authorship criteria, human subjects and animal research and IRB, scientific misconduct – identifying and</p>	<ol style="list-style-type: none"> <li>1. Become more familiar with the types of conflicts that arise at higher levels of academic research and instruction (i.e. those that occur at the level of professor) and how to avoid them or handle them appropriately.</li> </ol>	<ol style="list-style-type: none"> <li>1. Have active and purposeful discussions about responsible conduct in research in lab meetings.</li> <li>2. Attend ethics workshops/short course aimed at helping researchers identify and eliminate or mitigate possible conflicts of interest and research misconduct.</li> </ol>	<ol style="list-style-type: none"> <li>1. Facilitate discussions on responsible conduct and ethics</li> <li>2. Identify and support opportunities for advanced training in this area</li> </ol>

reporting, conflicts of interest)			
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## **E. Data access and publication agreement.**

(The following statement is provided as a starting point. Postdoc and mentor(s) should read and discuss and revise as necessary to reflect their agreement)

All data collected by the postdoc during the internship are to be available and shared openly between the postdoc and mentor(s). The postdoc will have the right, and indeed the responsibility, to write research articles concerning the project(s) he/she is responsible for and submit for publication as first author. This right/responsibility will remain in place for three years after the end of the postdoctoral internship, at which point, if publications have not been submitted the mentor(s) may publish the results independently. In the case of long-term and collaborative projects, the mentor(s) will work with the postdoc to define sub-components of the project that can be published within a short timeframe appropriate to the internship. The postdoc will include mentor(s) and other collaborators as co-authors, as appropriate, and will provide drafts with ample time for review. Mentor(s) will provide feedback on drafts as quickly as possible and will do everything possible to ensure that by the end of the internship the postdoc has a record of publications and other products that helps the intern achieve the defined career goals.