# GCC-NLM Professional Development Collection

**By:**
Dr. Sujata Krishna

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**Online:**
< http://cnx.org/content/col11276/1.5/ >

**C O N N E X I O N S**

**Rice University, Houston, Texas**

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Collection structure revised: September 22, 2011
PDF generated: June 21, 2013
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# Chapter 1

# 1. GCC-NLM Professional Development Repository[1]

**Gulf Coast Consortia NLM Professional Development (GCC-NLMPD) Curriculum for Biomedical Informatics Graduates**

| Main Idea | Specific Topics | Credit |
|---|---|---|
| **LEADERSHIP** | | |
| What I wish I Knew When I was 20 | What I Wish I Knew at 20 [2] - An overview of a wonderful book with this title. Talk about the importance of seeing problems as an opportunity, and of the importance of not burning bridges. Wonderful bits of advice that you don't always receive in life, but wish you had. | Stanford - Tina Seelig |
| Developing a Lab | Leading [3] - Offers guidelines for leading an effective research team, including a look at the role of lab directors. Includes tips on developing a vision or mission statement, directing and motivating people, and managing projects. | Rice ADVANCE |
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[1] This content is available online at <http://cnx.org/content/m37008/1.96/>.

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| | Staffing a Lab [4] - This online book provides useful information and advice for staffing your research lab, and is available for free download. Sections include advice on hiring postdocs and technicians and choosing the best postdoctoral position. | Burroughs Wellcome |
| | Interviewer Skills [5] - This workshop provides basic techniques and evaluation procedures used to screen for the best candidates | NIH video (1 hr) |
| | Designing Space [6] - Advice on construction of a new lab, and tips on storing and disposing of chemicals according to local rules and regulations. | Science Magazine Online |
| Management skills for Research | Setting Up Your First Lab [7] - Tips regarding the overall vision as well as potential personnel, equipment, and/or budget issues. Also gives a brief look into the daily life of an assistant professor and tips on gaining visibility.<br>Setting Up Your Lab Video (1 hr) [8] (Video Transcript) [9] | Rebekah Drezek & GCC-NLMPD - Brendan Lee |
| | Compliance [10] – A downloadable PDF version of the Guidelines for the Conduct of Research in the Intramural Research Program at NIH. | NIH |
| | Animal [11] - The primary reference for use and care of laboratory animals in research, and is intended to assist investigators in fulfilling their obligation to plan and conduct animal experiments in accord with the highest scientific, humane, and ethical principles. | Institute of Laboratory Animal Resources, Commission on Life Sciences (National Research Council) |

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| | Human subjects [12] - Provides a definition of human subjects research, as well as a brief overview of what educational activities do and do not constitute such research. | Research Administration, UC Irvine |
| | HiPAA [13] - links to the main page for HiPAA information at HiPAA.org. Includes information regarding the law, the DHHS, identifiers, transactions, and more. Also provides additional resources. | HiPAA.org |
| | IRB [14] - Provides information on which activities require IRB Review. | Research Administration, UC Irvine |
| | FDA [15] - links to the main page for the Food and Drug Administration, under the US Department of Health and Human Services (HHS). Includes information for scientists, researchers, and the general public. | FDA |
| | Running meetings [16]- Gives advice on how to run fun and effective lab meetings. Includes tips on preparation and activities before, during, and after the meeting. | AntLeader Leadership Series, UC Irvine |
| | Motivating Others[17] - focuses on the best way to motivate those around you to become happier, more efficient workers. Includes a chart of proficiency levels; how not to 'overdo it' in your motivation; essential questions you should ask yourself regarding motivation and improving efficiency; good interview questions to ask to evaluate the motivation level of prospective employees; and tips for learning on the job. A list of recommended reading is also included for further study. | Microsoft Education |

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| | Employee Feedback [18] - suggestions about giving effective feedback to employees and co-workers. Also includes a list of recommended books to increase leadership and interpersonal skills. | New York Univ. HR |
| | Listening skills[19] - Advises on the role of the empathetic listener in helping others to see past any negative and/or stressful emotions, coining the phrase "listening first aid." Includes free downloads of a 1 hr long seminar on listening skills (.mp3) | Gregorio Billikopf,UC-Davis |
| | Communicating in teams[20] - Focuses on team building, collaboration, and communication and is directed towards project managers. Includes tips on building a collaborative team, ideas for mobilizing the team via team building and social events, concepts such as Management By Walking About (MBWA), and advice for verbal and non-verbal communication with team members. | Simon Wallace |
| | Change communications [21]- This link provides ten key things to keep in mind when planning, announcing, implementing, and communicating a change initiative. | Sarah Fenson, Inc. |
| Management skills for Industry | Writing effective emails [22] - A concise summary of guidelines for writing professional emails. | NIH |
| | Internal correspondence [23] - Gives pointers as to how best to use internal communication at work to create a company culture and common goal. | Bacal and Associates |

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| | What not to say by email [24] - States 10 brief points to not put in an email. | Roger Matus |
| Mentoring Skills | Being a mentor[25] - How to improve your mentoring skills and explores issues that affect the research mentoring relationship. Includes free training materials and pre-made or custom curricula. (Mentor Relations Video - 1hr)[26] (Mentor-Mentee Expectations Video - 1 hr)[27] | Chris Pfund<br>+ Gayle Slaughter<br>+ Carrie Cameron |
| | Mentor-BioMedical Graduate Compact [28] - downloadable compacts for mentor-graduate relationships. These compacts include summaries of one's role and commitments as a graduate student, postdoc, or mentor. | AAMC |
| | Mentor-Postdoc Compact[29] - downloadable compacts for mentor-postdoc relationships. These compacts include summaries of one's role and commitments as a graduate student, postdoc, or mentor. | AAMC |
| | Conflict Management [30] - Free download of the book Party-Directed Mediation: Helping Others Resolve Differences (2nd Edition) as a PDF file. This book includes ideas for improving management of deep-seated interpersonal conflict through sound, research-based ideas. | Gregorio Billikopf, Univ. of California-Davis |

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| **STRATEGY** | | |
|---|---|---|
| Grant Writing | Obtaining Funding: Introduction [31] - An overview of grant writing, this page includes tips on how to write a successful proposal, be a competitive applicant, and obtain funding. Also includes general outline of review criteria for NIH and common grant requirements.<br>Grant Writing: K99/R00 and R01[32] - Slides from a workshop by this title. Talks about the mandatory and optional/supplemental form and how to obtain them, requirements for R01, overview and requirements of the Pathway to Independence (K99/R00) awards.<br>Video (2.5 hrs) [33] Video Transcript [34] | GCC-NLMPD - Phyllis McBride |
| | Small Grants R03 and Specific Aims [35] - A video (1.25 hrs) of the R03 grant application, followed by reviewing 1-page Specific Aims | GCC-NLMPD Phyllis McBride |
| | NLM Career Awards in Biomedical Informatics[36] - Slides from the NIH-NLM webinar by this title. | NIH |
| | (Video) [37] - A video of a 2 hr workshop on Introduction to Grant Writing | GCC-NLMPD - Phyllis McBride |
| | Tips [38] - A general advice page on obtaining grant funding, including tips for successful proposal writing and funding agencies to consider. | Rice ADVANCE |

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| | NIH-Grants [39] - Includes general tips for applying for an NIH grant, specialty programs/awards for early-career scientists, and web resources. | Rice ADVANCE |
| | Sample R01 Applications [40] - Four samples of exemplary R01 applications with the research strategy | NIH |
| | Grant reviews[41] - Video (.mp4 file) on the grant review process. | NIH Video (2hr 25 min) |
| | Dealing with Development & Donors [42] - A webpage with FAQs on donor development. | Mal Warwick Associates |
| | Research Administration Terminology [43] - Provides a glossary of research administration terms, many of which include relevant links for further study. | RCR Administrators |
| Networking | Professional Societies [44] - The value of joining Professional Societies is discussed briefly. A list of some important Professional Societies in various fields associated with the broad area of Biomedical Informatics is presented. | GCC-NLMPD - Sujata Krishna |
| | Networking at Conferences and Meetings [45] - Advice on designing a network-friendly conference, including tips for reminding attendees of the "networking basics." | Ed Bernacki |
| | Social Fluency[46] - Includes an introduction to social fluency, and tips on preparing for a network event and building your network over time. | GCC-NLMPD - Beth O'Sullivan |

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| | List of Contacts [47] - A concise overview for generating a list of networking contacts. | NIH materials |
| | Implicit Association[48], Professional Etiquette [49] - Presents a method, called the Implicit Association Test (IAT), that demonstrates conscious-unconscious divergences much more convincingly than has been possible with previous methods. Includes free implicit association tests as part of on-going research. | NIH Materials |
| **DECISION MAKING** | | |
| Career Pathways | Decoding Patterns of Success[50] - This blog talks about how to succeed in your work and about time management. His thesis is that setting out to find your passion and then working in that area is the wrong way round, you must first work hard at things that interest you and bring further interesting opportunities and the passion will develop. | Study Hack, Cal Newport, Ph.D. |
| | Planning Your Career: Satisfaction and Success[51] - The workshop provides insight into planning a job search, finding jobs, and using internet and community resources. Topics include self-assessment, transferable skills, networking, defining success, personal needs, work/life balance, and defining short-term and long-term goals. | NIH video (2 hrs) |

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| | Advice on how to choose a career[52] - Succinct general advice on how to choose your life's work | Steve Jobs |
| | Informational Interviews and Job Shadowing[53] - Advice on what to ask at an informational interview | Nature Scitable |
| | Plotting Your Career in Biomedical Informatics[54] - Deals with terminology in the field and what to think about when deciding your career in this field. | GCC-NLMPD Ted Shortliffe |
| | Short- & Long-term planning[55] - Provides advice for those seeking a job after undergraduate education, as well as on short-term and long-term career planning. | Quintessential Careers |
| | Career Pathways in Biomedical Informatics (Video Vignettes)[56] - consists of five video vignettes that offer a peek into the career paths of some individuals in the Biomedical Informatics area, including an assistant professor, a technical writer, and PhD and MD researchers working in a clinical lab setting. | GCC_NLMPD - Sujata Krishna + Gale Wiley |
| | Obtaining and Negotiating a Position in Industry [57] - Advises on the best way to negotiate a position in industry. Topics include what to look for in a job offer as well as understanding the new team environment. | NIH video (1.5 hr) |

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| | A Fitting Postdoctoral Position[58]- An brief article about issues to consider when choosing a post-doctoral position. See comments on the article, as they are valuable advice. | Inside Higher Ed |
| | An Academic Career[59]- Summary of a keynote presentation regarding careers in academia. Includes suggested reading, advantages of working in academia, and common fears when deciding such a career path. | Rice ADVANCE |
| | Dossier for Faculty Applications[60] - Advises on what you need in your dossier, teaching and research personal statements etc. | Stanford University |
| | Obtaining a Faculty Position in HE [61] - Includes tips on the application itself, research and teaching statements, and how to make your application stand out. | Rice ADVANCE |
| | Negotiating a Faculty Position in HE [62] - Introduces the reader to things to consider when negotiating a start-up package in the science and engineering fields, including research lab equipment/space and teaching assignments.<br>Sample Cover Letters for a Faculty Position [63] | GCC_NLMPD |

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| | Tenure & promotion criteria[64] (Video - 1 hr) [65] - Gives advice regarding the university promotion and tenure process to graduate students and post-docs who aspire to academic faculty positions. Includes tips on dossier preparation and how to best market your research, teaching, and service experience. | Rice ADVANCE |
| | Negotiating a Job Offer (Non-Academic) [66] - A video talking about how to negotiate an offer that is for a non-academic job. | NIH video (78 min) |
| Ethics | Plagiarism [67] -Includes a module to help students and professionals identify and prevent plagiarism and other questionable writing practices, and to develop an awareness of ethical writing. Includes sections on plagiarism, self-plagiarism, and the lesser crimes of writing. | Office of Research Integrity, HHS |
| | Research misconduct[68] - This 26 page PDF involves a Virtual Experience Interactive Learning Simulation (VEILS) program, in which participants will assume one of four playable roles: a graduate student, a postdoctoral student, a principal investigator, or a research integrity officer. In each segment, the character has to make decisions about how to handle possible research misconduct. | Office of Research Integrity, HHS |

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| | Respond to Research Wrongdoing[69] - A user-friendly guide to how to respond to research wrongdoing. | American Association for the Advancement of Science |
| | Responsible Research [70] - On the subject of dual use research, including public health and national security concerns. | NIH video (2 hr 28 min) |
| | Animal–based research[71] - This page from the APA outlines the goals of the Committee on Animal Research and Ethics (CARE). Also includes related resources, annual reports, and contact information. | American Psychological Association |
| | Medical Ethics [72] - Ethical challenges at the intersection of clinical research and clinical practice. | NIH video(1 hr) |
| | Exploitation [73] - Focuses on the ethical and regulatory aspects of clinical research, including research protocols, informed consent, and controversial issues relating to human subject research. | NIH video (2 hr 28 min) |
| | Professionalism in Medicine [74] - Focuses on using two traditions of open ocean navigation to increase moral development and professionalism in medicine. | NIH video(1 hr) |
| **INNOVATION** | | |
| Innovation | From Academia to Your Own Start-Up [75] (Video Transcript) [76] - An example of an academic who successfully starts-up his own Biotech company | GCC_NLMPD - Glauco Souza |

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| | On Innovation [77] - 19 min video by Charles Leadbeater on innovation, patents and copyrights and open-source, shared innovation. | TED |
| | On Innovation [78] - Crowdsourcing and open innovation. | NIH video |
| | License to Pursue Dream [79] - Marissa Mayer on the effects of Google's 20% employee time for working on their own projects. | Stanford video |
| Research Ideas | Creativity and Paradigms [80] A talk about 5 spokes in the creative wheel: Challenge, Autonomy, Purpose, Mastery and Tools. | GCC_NLMPD - Tom Kraft |
| | Creativity [81] - Focuses on the best way to instill creativity in yourself and those around you. Includes a chart of proficiency levels; how not to 'overdo it' in your creativity; essential questions you should ask yourself regarding creativity and improving efficiency; good interview questions to ask to evaluate the creativity level of prospective employees; and tips for learning on the job. A list of recommended reading is also included for further study. | Microsoft Education |

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| | Critical Reading of Medical and Scientific Literature[82] - This workshop provides examples of how best to analyze scientific literature as you read it. Strategies for reading papers regularly, making notes etc. are provided. | GCC-NLMPD - Gayle Slaughter |
| Scientific Curiosity | Bringing an idea to the market (video 1hr) [83] – patents, licensing and income issues are discussed and a timeframe suggested. | GCC-NLMPD - Larry Hope |
| | Utility Model [84] - A brief summary of the function of a utility model, including what it can protect, how it can be invalidated, and the difference between a utility model and a patent. | Forssen and Salomaa Oy |
| | Technology transfer issues [85] - This website gives the policy and procedures at Stanford university. It may be studied as an example of how technology transfer is dealt with at a university. | Stanford University Website |
| **EXECUTION** | | |
| Writing skills | Dissertation [86]- Concrete tips in a starter-kit on how to get a Dissertation Writing Group together and how to keep it going | University of Wisconsin |
| | Writing a Paper for Nature [87] (video transcript) [88] From the perspective of two professors who have published several articles together in the journal Nature or Science, they reveal how to adjust ones writing style to such a journal. Includes detailed comments on student abstracts. | GCC_NLMPD Shaulsky and Kuspa |

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| | Scientific Papers [89], Abstracts[90]- This link provides step-by-step help for writing a research paper. This in-depth video covers each of the components of a strong abstract, including title, intro, thesis, materials and methods, results, summary, and conclusion. | SACNAS |
| | Writing a Scientific Paper [91], How To Submit a Paper to a Journal[92]- This link provides tips for how best to present your research results for publication and how to submit the paper. | Science and Development Network |
| | Writing as a Team [93] - A summary of the tips for team work and team writing. | GCC-NLMPD - Beth O'Sullivan |
| | Use of new media [94] – While few Universities have a formal policy on the use of new media this link provides some insight into the issue. | University of Minnesota |
| Communication skills | Communication strategy [95] - Helps you think about your goals and motivations in choosing how best to communicate. | AHRQ |
| | Elevator Talks[96]<br>Five Minute Presentations[97] | GCC_NLMPD Tom Kraft |
| | Technical Presentations[98] | Rice ADVANCE |
| | Citing from Twitter[99] | The Atlantic |
| | Designing a Presentation[100] | NIH Training video (2.24 hr.min) |
| | Presenting seminars[101] - This link provides instructions on how to capture and hold your audience's attention, what should be included on your slides, how much text, and which font and illustration should be used on your presentation. | NIH video(1 hr) |

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| | Poster presentation skills[102] - This presentation focuses on selecting and organizing data, what to include and what not to include, the key components of a successful poster, lay-out and font selection, and poster presentation.Poster Design video (1 hr)[103] | NIH Video (1 hr)+ GCC Workshop video |
| | Dealing with the Media - Your Work in the Headlines[104] - This link provides information on why you should agree to an interview, what could go wrong in an interview, and how to prepare for good media interactions. | Elisabeth Pain |
| | Public speaking about your research[105] - Tips on public speaking | Dewey Decimal Classification |
| | Chairing a Conference Session[106] Introducing speakers, managing time, managing questions | Nature Scitable |
| | Panel Discussions [107] Preparing a panel, moderating the discussion | Nature Scitable |
| | Team presentation skills [108] - Brief but informative list originally published in the January 1998 issue of Presentations magazine gives 10 team presentation tips from the pros. | Jon Hanke |
| | Teaching [109]– University Teaching and Learning Center offers a handbook for teaching, tip and advice on what works | Stanford University |
| Networking Skills | CV and resume [110] - This workshop highlights the critical elements and structure of both CVs and resumes. These important job documents serve as the foundation for all job searches, and knowing how to create them based on the employment sector and published position description is essential. | NIH |

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| | Formal Letters, [111] - A brief introduction to writing formal letters such as cover letters, focusing on their content and tone | Nature Scitable |
| | Cover Letters, [112] - Focuses on cover letter and resume construction targeted towards industry jobs. | NIH |
| | Thank You Letter [113] - How to write a thank you note after a job interview, and how to accept or decline an offer in writing. | Nature Scitable |
| | Interview Preparation [114] - Invaluable for anyone preparing for an employment interview in academia or industry. Includes sample lists of questions asked by employers, behavior-based questions, questions asked for academic positions, and questions you can ask your interviewer. Also includes a basic list of interviews do's and don't's. | NIH Materials- video (65 min) |
| | Interviewing Skills[115] - Summarizes a panel discussion on how to stand out during the faculty candidate interview process. Includes advice on preparing for the interview, preparing your questions, and what to do after the interview is over. Interviewing Skills video (1.5 hrs)[116] | GCC-NLMPD - Gayle Slaughter (video) |

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| | (video)[117] - focuses on hot to give an outstanding, memorable job talk for a variety of audiences. Learn important elements to be included in any job talk, tips on giving a successful academic "chalk talk," how to structure your talk for your specific audience, and more! | NIH Video(2 hr) |
| | Behavioral Interviews [118] - This webpage describes behavioral interviews and where they are used. Links to sample questions. | Quintessential Careers |
| | Interview for Industry [119] - Summarizes a panel discussion on how to maximize the impact of your faculty candidate interview seminar. Includes advice on what to know before your visit, how to handle yourself during the visit and departmental talk, and how to tackle hard questions. | Rice ADVANCE, NIH video (1hr:47 min) |
| | Interview Seminar[120] (video)[121] - The video provides strategies on how to maximize the impact of your interview seminar. | Rice ADVANCE, NIH Video (2 hrs) |
| | Evaluating Positions and Negotiating a Job Offer[122] - This video provides networking skills, particularly position evaluation and job offer negotiation. | NIH |
| | Elevator Talk [123] - Links to a YouTube channel of business proposal 'elevator pitches' - approximately one minute long speeches – given by students competing in the 2011 Rice Business Plan Competition. | Rice University |

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| Time Management | Prioritizing, Making Timelines [124] - provides a brief overview of time management, including advice on clarifying your goals, delegating successfully, and managing procrastination and stress. Also included is a link to Randy Pausch's talk on time management.<br>Time Management video (1hr) [125] - Based on David Allen's 'Getting Things Done' | GCC-NLMPD- Sujata Krishna<br>GCC_NLMPD- Marie Wehrung |
| | Setting Goals [126] - This video provides information on how to set goals to maximize productivity and to effectively manage time. | NIH video (1hr, 40 min) |
| Collaboration | Collaboration and Team Science [127] - Pertinent questions regarding your readiness to participate in and/or lead a successful research team. The project seeks to discover a set of best practices for collaborations among NIH scientists and researchers and offers a free Team Science Field Guide. | NIH: Bennett, Gadlin and Levine-Finley |
| | Conflict Resolution [128] - This webpage provides information on common conflict and steps for conflict resolution. Conflict Resolution video(2 hrs) [129]. Video Transcript[130] | University of Wisconsin + GCC_NLMPD- Mikki Hebl. |

**Table 1.1**

[2] http://ecorner.stanford.edu/authorMaterialInfo.html?mid=2266
[3] http://cnx.org/content/m33896/latest/
[4] http://www.scribd.com/doc/2544488/Staffing-the-Lab-Perspectives-from-Both-Sides-of-the-Bench
[5] http://videocast.nih.gov/Summary.asp?File=12484
[6] http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/1680/toolkit_designing_your_laboratory/
[7] http://cnx.org/content/m37012/latest/
[8] http://bit.ly/jje7OG
[9] http://cnx.org/content/m41611/latest/
[10] http://sourcebook.od.nih.gov/ethic-conduct/Conduct%20Research%206-11-07.pdf
[11] http://www.nap.edu/openbook.php?record_id=5140
[12] http://www.research.uci.edu/ora/hrpp/definition.htm#Definition
[13] http://www.hhs.gov/ocr/privacy/
[14] http://www.research.uci.edu/ora/hrpp/definition.htm
[15] http://www.fda.gov/default.htm
[16] http://spac.ucdavis.edu/forms/leadership_tips/running_fun_and_effective_meetings.pdf
[17] http://www.microsoft.com/education/competencies/comp_motivatingothers.mspx
[18] http://www.managementhelp.org/commskls/feedback/basc_gde.htm
[19] http://www.cnr.berkeley.edu/ucce50/ag-labor/7article/article40.htm
[20] http://www.epmbook.com/team.htm
[21] http://www.inc.com/articles/2000/06/19312.html
[22] https://www.training.nih.gov/writing_professional_e-mail
[23] http://performance-appraisals.org/Bacalsappraisalarticles/articles/comstrat.htm
[24] http://www.deathbyemail.com/2008/12/10-things-never-to-put-in-email.html
[25] http://www.researchmentortraining.org
[26] http://wmdp.rice.edu/NaturalScience/KeckCenter/Sem/KeckSem-11Feb11/KeckSem-11Feb11.mp4
[27] http://bit.ly/uWdbAi
[28] https://www.aamc.org/initiatives/gradcompact/
[29] https://www.aamc.org/initiatives/49784/postdoccompact/
[30] http://www.cnr.berkeley.edu/ucce50/ag-labor/7conflict/
[31] http://cnx.org/content/m37150/latest/
[32] http://cnx.org/content/m38302/latest/
[33] http://bit.ly/kWEpTB
[34] http://cnx.org/content/m41666/latest/
[35] http://bit.ly/zMoFAq
[36] http://www.nlm.nih.gov/ep/NLM_EP-Webinar9_22_11.pdf
[37] http://bit.ly/etaEf3
[38] http://cnx.org/content/m37014/latest/
[39] http://cnx.org/content/m19394/latest/
[40] http://www.niaid.nih.gov/researchfunding/grant/pages/appsamples.aspx
[41] http://videocast.nih.gov/podcast/oite/oite062910/oite062910.mp4
[42] http://www.malwarwick.com/mals-corner/askmal/donordevelopment.html
[43] http://ori.dhhs.gov/education/products/rcradmin/glossary.shtml
[44] http://cnx.org/content/m37088/latest/
[45] http://www.successfulmeetings.com/Event-Planning/Conferences/Articles/How-to-Design-a-Networking-Friendly-Conference/
[46] http://cnx.org/content/m37016/latest/
[47] https://www.training.nih.gov/generating_networking_contacts
[48] http://implicit.harvard.edu/implicit/demo/
[49] http://videocast.nih.gov/ram/oite032509.ram
[50] http://calnewport.com/blog/
[51] http://videocast.nih.gov/summary.asp?Live=10055
[52] http://www.bbc.co.uk/news/world-us-canada-15197932
[53] http://cnx.org/content/m37008/latest/www.nature.com/scitable/topicpage/panel-discussions-13909630
[54] http://bit.ly/iuCCzf
[55] http://www.quintcareers.com/career_plan.html
[56] http://cnx.org/content/m37011/latest/
[57] http://videocast.nih.gov/summary.asp?Live=8661
[58] http://www.insidehighered.com/advice/2011/06/01/essay_on_picking_a_postdoc_position#Comments
[59] http://cnx.org/content/m36864/latest/
[60] http://cnx.org/content/m36874/latest/
[61] http://studentaffairs.stanford.edu/sites/default/files/cdc/files/DossierPreparation_05-06.pdf

[62] http://cnx.org/content/m19388/latest/
[63] http://cnx.org/content/m43411/latest/
[64] http://cnx.org/content/m38087/latest/
[65] http://bit.ly/hOGhiQ
[66] http://videocast.nih.gov/summary.asp?Live=11059
[67] http://ori.hhs.gov/education/products/plagiarism/
[68] http://ori.hhs.gov/TheLab/TheLabGuide.pdf
[69] http://www.koocher.com/images/RRW_7-17-10.pdf
[70] http://videocast.nih.gov/summary.asp?Live=9435
[71] http://www.apa.org/science/leadership/care/index.aspx
[72] http://videocast.nih.gov/summary.asp?Live=9410
[73] http://videocast.nih.gov/summary.asp?Live=9628
[74] http://videocast.nih.gov/summary.asp?Live=9412
[75] http://bit.ly/vG3EI0
[76] http://cnx.org/content/m43325/latest/
[77] http://www.ted.com/talks/charles_leadbeater_on_innovation.html
[78] http://videocast.nih.gov/summary.asp?Live=10366
[79] http://ecorner.stanford.edu/authorMaterialInfo.html?mid=1527
[80] http://bit.ly/x9t8U6
[81] http://www.microsoft.com/education/competencies/comp_creativity.mspx
[82] http://bit.ly/KbLADk
[83] http://bit.ly/iHKuWI
[84] http://www.fspat.com/utility_model.html
[85] http://rph.stanford.edu/5-1.html
[86] http://www.grad.wisc.edu/education/gspd/dwgstarterkit.pdf
[87] http://bit.ly/vtUUDJ
[88] http://cnx.org/content/m43326/latest/
[89] http://www.ruf.rice.edu/~bioslabs/tools/report/reportform.html
[90] http://sacnas.org/content/writing-effective-abstract
[91] http://www.scidev.net/en/practical-guides/how-do-i-write-a-scientific-paper-.html
[92] http://www.scidev.net/en/practical-guides/how-do-i-submit-a-paper-to-a-scientific-journal-.html
[93] http://www.cs.pomona.edu/~markk/cs121.s07/supp/teams.html
[94] http://www.oit.umn.edu/tech-brief/social-media/index.htm
[95] http://bit.ly/f0zP3C
[96] http://bit.ly/xNv2Dq
[97] http://bit.ly/rY1dkz
[98] http://cnx.org/content/m36873/latest/
[99] http://bit.ly/x5Ck0S
[100] http://videocast.nih.gov/launch.asp?16513
[101] http://videocast.nih.gov/launch.asp?16513
[102] http://videocast.nih.gov/summary.asp?Live=9360
[103] http://bit.ly/mmVztI
[104] http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2008_09_12/caredit.a0800134
[105] http://www.aresearchguide.com/3tips.html
[106] http://www.nature.com/scitable/topicpage/chairing-sessions-13908566
[107] http://www.nature.com/scitable/topicpage/panel-discussions-13909630
[108] http://www.ou.edu/class/bc2813/PresentationTips/10TipsFromThePros.htm
[109] http://ctl.stanford.edu/further-ctl-resources.html
[110] http://videocast.nih.gov/summary.asp?Live=10113
[111] http://www.nature.com/scitable/topicpage/thank-you-letter-13989101
[112] http://videocast.nih.gov/Summary.asp?File=14776
[113] http://www.nature.com/scitable/topicpage/formal-letters-13988017
[114] https://www.training.nih.gov/assets/Interviewing_Handout.pdf
[115] http://cnx.org/content/m36869/latest/
[116] http://bit.ly/lBHGno
[117] http://videocast.nih.gov/Summary.asp?File=14792
[118] http://www.quintcareers.com/behavioral_interviewing.html
[119] http://videocast.nih.gov/Summary.asp?File=14806
[120] http://cnx.org/content/m36865/latest/
[121] http://videocast.nih.gov/Summary.asp?File=14583
[122] http://videocast.nih.gov/podcast/oite/oite011410/oite011410.mp4

**Acknowledgement**
The project described was supported by Award Number T15LM007093 from the National Library of Medicine. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Library of Medicine or the National Institutes of Health.

[123] http://www.youtube.com/user/jonesgraduateschool#g/c/01D470865EA983AC
[124] http://cnx.org/content/m37116/latest/
[125] http://bit.ly/lWf2SC
[126] http://videocast.nih.gov/podcast/oite/oite120908/oite120908.mp4
[127] https://ccrod.cancer.gov/confluence/display/NIHOMBUD/Home
[128] http://www.ohrd.wisc.edu/onlinetraining/resolution/index.asp
[129] http://bit.ly/ma4Jhu
[130] http://cnx.org/content/m41551/latest/

# Chapter 2

# 2. Setting Up Your First Lab[1]

NOTE: " * Adapted from Dr R. Drezek's Keck Seminar (2006) "*Establishing a New Interdisciplinary Biomedical Research Lab*[2] " "

This document is for those who want to be a University Professor. Here you will find advice on when and how to start thinking about building your own lab.

Take stock of where you are in your career progression at present and where you wish to be in one, five and ten years. Plan accordingly. Discuss these plans with your current mentors and colleagues. This provides a reality check and someone may show you something you had not thought of.

Here is a flavor of what you are in for as an Assistant Professor.

## 2.1 A Typical Day as an Assistant Professor

**(Published with permission.)**

| **A Typical Day of Dr Drezek, as an Assistant Professor** | |
|---|---|
| 8:30-10:15 | Meeting at MDACC on OR ovary study. Our protocol was approved. (Yay!). Did we mention it has to be absolutely pitch dark? |
| | Try to get back to Rice on time for Nanobio training review. Hope it is not raining (irritates my Segway...) |
| | *continued on next page* |

[1]This content is available online at <http://cnx.org/content/m37012/1.2/>.
[2]http://edtech.rice.edu/cms/?option=com_iwebcast&task=webcast&action=details&event=622

| | |
|---|---|
| 10:15-10:30 | Nanobio student #1 review (I am co-supervisor on joint project) |
| 10:30-10.45 | Nanobio student #2 review (I am co-supervisor on joint project) |
| 10.45=11.00 | Meeting with postdoc #1 on paper revisions due last week. |
| 11:00-11:30 | Meeting with student project team #1 for BIOE 572 |
| 11:30-12:00 | Meeting with grad student #1 on fl project. |
| 12:00-12:30 | Meeting with grad student #2 on job search. |
| 12:30-1:00 | Meeting with grad student #3 on protocol for R21 (Did I mention I have a R21 due today? By 5:00.) |
| 1:00-1:30 | Forage office for food. |
| 1:30-2:00 | Meeting with student having HW trouble in BIOE 572 |
| 2:00-2:30 | Meeting with student project team #2 for BIOE 572 |
| 2:30-3:00 | Meeting with grad student #4 on paper submission |
| 3:00-4:00 | Weekly teleconference on RO1 #1. Curse each other (as always) for choosing mouse model for colon cancer. Learn more than you ever care to know about strategies for colonoscopy in mice. |
| 3:45-4:00 | Leave teleconference early to hook up computer for this seminar |
| 4:00-5:00 | Give seminar. |
| 5:00-6:00 | Teleconference to discuss competing renewal of RO1 #2. |

**Table 2.1**

## 2.2 Life as an Assistant Professor

You might think your biggest problem will be getting funded. Nope. Your biggest problem will be **time**, if you are successful.

| **Fall 2002 (Year 1)** | **Fall 2005 (Year 4)** |
|---|---|
| 1 graduate student/0 postdocs | 10 graduate students/2 postdocs |
| No grants | Funding from NIH, NSF, and private foundations |
| ∼1000 sq ft lab/office space | ∼1800 sq ft lab/office space |
| Never had taught a class | Taught 6 classes |
| Did most of research myself | Mostly manage others |
| Being a professor feels like a big stretch... | Being a professor feels relatively OK... |

**Table 2.2**: Changes with Time for an Assistant Professor

## 2.3 Planning Your Lab

This section covers: The vision, Personnel Issues, Equipment Issues and Budget Issues.

The Vision:

- Put together a plan for *your* research program – separate from your PhD or postdoc advisor – the year before applying for jobs, i.e. in the last stages of your training. Outline the material and personnel needs for this vision. You will need this to negotiate your faculty position.
- Decide how much of your lab will focus on techniques known to you and how much effort will be devoted to learning new techniques. Do new techniques involve a robust piece of equipment you can buy or do you need time on a shared facility.? For example, Confocal microscopy, Real-time PCR etc. may be core facilities you want to buy time on. Consider costs, feasibility and timelines.
- If you are going to handle animals, human samples or radiation get approval and licenses ahead of time.
- Collaborating with others on a campus can begin to get you useful data while you own lab is still being set up. If the Department has new techniques of interest and faculty who are open to sharing/mentoring you are in a strong position.
- Your 'vision' will help determine where you seek a faculty position.
- Consider the way Science Research is structured at your University – how funding opportunities affect the short-term and long-term success.
- Prioritize what your first students will work on – make sure it is different enough from your last lab that people will know it is yours.
- Productivity – In most research circles productivity is measured in papers and grants.
- Not all your time will go into directly productive activity. You will need some time to set-up and train your lab.
- Introduce yourself early to the department's finance and purchasing officer.
- There is no ready manual for how to set up and build your own lab for the first time

Personnel Issues:

- 4 types of personnel may be in your lab – postdoc, grad student, undergrad and technician. Technician may be productive straight away, graduate student after a couple of courses, and post-docs somewhere in between. Postdocs have a vested interest in productivity. Carefully match research tasks to appropriate personnel. Failure to do so will waste time and cause discontentment.
- Expectations & Objectives – You need to set these out clearly for each person in your lab.
- Productivity does not scale linearly with numbers of students/postdocs
- While it is tempting to grow as fast as possible, resist this – better to grow gradually

- Plan to have a steady flux of students in/out of your lab and avoid a major phase transition 5 years in
- Have a plan for what size group is right for you – don't let your grants completely dictate this (it can be easier to obtain grants than to manage them.)
- Be very, very picky about who is in your group! Go for quality rather than quantity.
- You will need to invest time in training new personnel or setting up new techniques. Plan carefully and optimize use of your time.
- Get to know your HR to familiarize yourself with local hiring practices. HR will help you determine the salary range for the level of personnel you hire. See if you can hire people with a 'trial period' within which either side can withdraw with no negative consequences.

Equipment Issues:

- Find out what your school has available
- Don't make assumptions – Rice didn't have a good confocal microscope when I arrived and I had never thought to ask...
- Play the vendors off each other (Fisher/VWR etc.)...
- Can save a lot of money buying used equipment - check out Rob Raphael's E-bay lab at Rice University.
- Contact the Health and Safety Officer for lab safety requirements
- VWR has an online lab planner[3] and checklist[4] .

Budget Issues:

- Draw up a budget before you begin. It must include consumables, small equipment etc. and have room for contingency.
- Budgets are usually discussed as part of Negotiating Your Faculty Position. Else, speak to your Department Chair.
- Lab Space – Can customized alterations be made to the lab space to suit you? Check with buildings people to ensure compliance issues and provision of outlets, ventilation, gas lines, internet access etc.
- Try to have your start up $s loosely defined – a pile of $s you can use for anything, so you can move start up equipment $ to people $. And shift more equipment and less people $s to your grants (when possible)
- This way if you move schools during your career, in most cases, you can keep your stuff.
- Retooling and repeated training of lab personnel will be necessary over time.
- Ask your chair to 'carry over' a bit of money you save in a flexible account that you can use to seed new work, pay a student, purchase something you forgot earlier or to fix something.
- Keep an organized file of your orders. It will make reordering consumables much easier.
- Create a procedures and protocols book and standard data template. Require all workers in the lab to follow the same procedure.

## 2.4 Gain Visibility as an Assistant Professor

- Get your own students to conferences early on – helps advertise to your field your switch to PI
- Loyalty does *not* mean not considering the possibility of being somewhere else – being in demand can help your own, your department, and your institution's prominence (Proceed with caution!)
- Speak at meetings
- Publish
- Write reviews.
- The more your name is out there the better your networking opportunities and grant success, also greater likelihood of attracting good staff.

## 2.5 Protect Your Time Relentlessly

- Be really careful about service – tempting to do too much too soon
- Actively limit teaching preparation time
- You absolutely can't say no enough...
- It is OK to say no to review requests, panels, talks...
- Know which things don't deserve your best effort – save it for what really matters
- Know which things don't deserve *any* effort
- Pre-tenure years pass very, very quickly...

[3] http://www.vwrsp.com/labplanner
[4] https://www.vwrsp.com/new_lab/page.cgi?tmpl=index

- 
- Timeline for your Lab:

| Last year of Post-doc | Offer of Faculty Position | Year 1 | Year 4 |
|---|---|---|---|
| Plan the lab and estimate a budget | Negotiate for lab monies based on your budget | Take on only as many students as you can handle. Results will not flow until lab is set up and students are trained.Apply for grants aimed at new faculty. | Plan to have as many students and post-docs as you can mentor.By this stage you want to be on large grants e.g.NSF, NIH |

**Table 2.3**

**Further Advice**

- Seek advice from young Faculty while you are still a post-doc. Ask them how they settled in. What was difficult for them?
- Plan early, be creative and don't be afraid to take risks.

**Help for Setting Up Specific Labs**

- Setting Up a PCR Laboratory[5]
- Setting Up a Capillary HPLC Lab[6]

## 2.6 References


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3. (2010)*VWR Lab Planning Guide*[9] .
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[5] http://www.biosupplynet.com/pdf/01_PCR_Primer_p.5_14.pdf
[6] http://www.ionsource.com/tutorial/capillary/caporder.htm
[7] http://edtech.rice.edu/cms/?option=com_iwebcast&task=webcast&action=details&event=622
[8] http://www.the-aps.org/careers/careers1/mentor/startingalab.htm
[9] https://www.vwrsp.com/lab_setup/pdf/lab_planning_guide.pdf
[10] http://www.biosupplynet.com/pdf/01_PCR_Primer_p.5_14.pdf
[11] http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2000_04_14/noDOI.3922973750920805208
[12] http://www.hhmi.org/resources/labmanagement/moves.html

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[13] http://cshprotocols.cshlp.org/cgi/content/abstract/2007/7/pdb.top14

# Chapter 3

# 3. Obtaining Funding[1]

NOTE: * Collated from work by Semahat Demir (NSF), Lydia Kavraki (Rice), Rob Raphael (Rice), and Joan Strassmann (Rice), and Jane Grande Allen (Rice).

## 3.1 Introduction

Funding is important for obtaining tenure in an institution of Higher Education in the United States. You need to be prepared to address the funding issue in the long run. So, how can you prepare for a grant? You need more than a great idea.

- Ask important, big questions
  - Do not redo your Ph.D. or postdoc work
  - Find a substantially new project if your proposal is rejected twice.
  - Read deeply and broadly (at least 5 articles a day).
  - Be creative.
  - Do not be afraid to do something really different.
  - Talk to lots of people about research.
- Have several projects at once
  - Keeps you excited.
  - When one project faces problems, another could be blooming.
  - Increases funding opportunities.
  - Synergy in thinking about different things can suggest novel pathways.
  - Increases your visibility.
- Write clear, well-researched proposals
  - The proposal must be impeccable, no typos, clear headers, clear flow from hypotheses to methods.
  - Follow the format of the agency exactly.
  - Include preliminary data and figures.
  - Get sample funded proposals by asking people for them, preferably those not too close to your research.
  - Have several people read your proposal.
  - Leave enough time, at least 3 months for several drafts and for feedback.
- Collaborate

[1] This content is available online at <http://cnx.org/content/m37014/1.3/>.

  - New ideas often come from collaboration.
  - Techniques and approaches can be shared.
  - This is the ONLY way to succeed without turning into a workaholic.
  - Teamwork is fun!
  - Find collaborators from a broader pool than is initially comfortable, and bridge the gaps with frequent meetings.
  - Same-stage collaborators are often best.

- Keep Publishing
  - The search for funding can be discouraging, be prepared to fail.
  - Keep trying, but don't forget to keep publishing anyway.
  - Write up your research quickly.
  - Write a mini-review, review, perspective etc. at least every 2 years.

- Obtain Funding Information
  - NSF and NIH are not the only sources of funding.
  - Learn about those grants requiring nominations, and get them.
  - Ask as many people as possible about how to find funding opportunities: faculty mentor, graduate/postdoc mentor, department chair, colleagues, Office of Sponsored Research, Foundation Relations Office.
  - Get on e-mailing lists for funding announcements – e.g. NIH, NSF, Listservs appropriate for your field, Multi-disciplinary grants' mailing lists etc.
  - If there is a funding opportunity that you are interested in, ask the Deans' office to find out who else at your institution has been funded by this agency. Talk to this person, get a copy of their funded award, get any inside information that you can.
  - Be a detective! Find out which agencies have funded your colleagues and persons in comparable positions at other schools. Some people have this information on their websites or CV.
  - It is a good idea to contact the funding agency to see how your idea aligns with their funding priorities. Have a short abstract ready with your tentative specific aims BEFORE you contact them.
  - Send versions of the same project to multiple funding agencies, but tailor the scope of project as appropriate.
  - Send versions of the same project to multiple funding agencies, but tailor the scope of project as appropriate.
  - Apply for any and all internal/local funding opportunities you can find. Take these applications seriously and don't put them together at the last minute. This is a great way to get preliminary data and a preliminary draft of your next major proposal.
  - Apply for any and all internal/local funding opportunities you can find. Take these applications seriously and don't put them together at the last minute. This is a great way to get preliminary data and a preliminary draft of your next major proposal.
  - Make a spreadsheet of opportunities and deadlines.
  - APPLY. You won't get the grants you don't apply for. NIH and NSF review panels are impressed by young investigators with multiple pending grants – it shows that the applicant is seriously aggressive about securing funding.
  - Take advantage of your research office in learning about private funding.

## 3.2 The Logistics

- Identify a funding agency and learn everything you can about this agency (the web and your colleagues are good sources)

- Understand the mechanism for submitting a proposal from your institution
- Develop a time frame for writing and proofreading the proposal
- A proposal needs a budget and appropriate signatures.

## 3.3 Tips for Successful Proposal Writing

- Determine if your project is relevant to the program
- Get in touch with the Program Director
- The Program Director is part of:
  Review Panels
  Award/decline recommendation
  Post management of the awards (progress report)
- Follow the instructions posted by the agency Format, sections, project plan
  Agency's Review Criteria (NSF Merit Review Criteria)
  Priority Areas for the agency

- Respond to a solicitation
  Deadlines (pre-proposal, letter of intent, full proposal)
  Additional review criteria and requirements
- Read "successful" proposals of your colleagues
- Have your proposal reviewed by collaborators or colleagues before submitting
- Do not wait to submit on the day of the deadline

## 3.4 Writing Great Grants: A Three Step Recipe

1. Choose a significant problem
   * Bonus points if not much work has been done on the problem
   * More bonus points if you have done the important work
2. Leave no doubt that you can accomplish your aims
   * Established track record of publications
   * Clear and convincing preliminary data
3. Write a clear, easy to read proposal

## 3.5 Big Hurdles and Pitfalls

Some potential pitfalls you may encounter are:

- Laboratory techniques not yet working
- Students not yet trained/busy with classes
- Teaching and other responsibilities
- Proposing to do too much
- Not making clear the points and connections that are obvious to you

## 3.6 Do and Don't

- Do not necessarily assume the person who reviews your grant will be an expert in your area or know why your research is novel
- Get grants done in advance and have colleagues read them.
- Stay Abreast of what different institutes consider "Young Investigator Status"

- The response to a revised NIH grant is very important.
  Never appear to be angry or emotional. Just stick to the science. If a reviewer got something wrong (which often happens), just lay out the facts.
  This is hard because you have put so much effort into the grant it's easy to take comments personally
  Criticisms are of the science, not of you!

## 3.7 Funding Agencies To Consider (not a comprehensive list)

Listed here are some points about the two main funding agencies: NIH and the NSF. However, there are many other funding agencies, other than the two main ones.

1. NIH (www.nih.gov)
   * R03 "small grant" mechanism. Review panels can be a tad easier on these applications.
   * R21 for exploratory/developmental research. Less preliminary data needed.
   * R01 – primary investigator-initiated mechanism. Substantial preliminary data needed.
   * Director's New Innovator Awards and Pioneer Awards

2. NSF (www.nsf.gov) * apply for both CAREER and regular research grants (not with the same project)
   * if you get NSF funding, apply for any and all supplements!

3. Military-related funding
4. DOD Congr. Directed Medical Research Programs
5. DOE
6. DARPA (http://www.darpa.mil/BAA/)
7. Army Research Lab (http://www.arl.army.mil/)
8. ONR (http://www.onr.navy.mil/02/BAA/)
9. Air Force (http://www.wpafb.af.mil/)
10. Welch Foundation (http://www.welch1.org/)
11. Oak Ridge Associated Universities Powe Junior Faculty Enhancement Award
    http://www.orau.org/consortium/programs/powe/powe-awards.htm
12. Human Frontier Science Program (www.hfsp.org)
    * Early Career and non-EC grants, also travel fellowships
13. HHMI (www.hhmi.org)
    * Early Career and non-EC professorships/research awards
    * Fund the person, not the project
    * Learn more from Foundation Relations Office
    * Calls for applicants not every year
14. Packard Foundation
    http://www.packard.org/
15. Sloan Foundation (http://www.sloan.org/programs/scitech_fellowships.shtml)
16. Dreyfus Foundation (http://www.dreyfus.org/)
    * Teacher-Scholar Awards
    * New Faculty and Faculty start-up awards
    * Internal competition first
17. Pew Scholar (http://www.futurehealth.ucsf.edu/pewscholar.html)
    * Nominated by university
18. Searle Scholar (http://www.searlescholars.net/)
    * Nominated by university
19. Beckman Foundation (http://www.beckman-foundation.com/byi.html)
    * Very short application (4 pages)

20. Coulter Foundation (http://www.whcf.org/)
    * Heavy, heavy focus on commercialization development
21. Keck Foundation (http://www.wmkeck.org/programs/scholars.html)
    * Nominated by university
22. Partnership for Cures
    http://www.4cures.org/
    * formerly Culpeper Biomedical Pilot Initiative
23. Burroughs Wellcome Award (http://www.bwfund.org/)
    * variety of biomedical funding priorities
    * variety of eligible career stages
24. Field-specific agencies
    * Ask around to find out what is appropriate for your field
    * Apply to field-specific agencies in addition to NIH/NSF
    * For example:
    * American Heart Association – local and regional (can submit "same" project to both)
    * March of Dimes
    * American Federation for Aging Research
    * National Heart Foundation
    * Mizutani Foundation for Glycoscience
    * Children's Heart Foundation
    * Alternatives Research and Development Foundation
    * Pfizer
    * International Society for Heart and Lung Transplantation
25. CRISP – Database of funded projects
    * http://crisp.cit.nih.gov/
26. NIH Review Criteria
    * http://www.csr.nih.gov/guidelines/r01.htm
27. Article: How to get NIH funding
    * http://nextwave.sciencemag.org/cgi/content/full/2000/10/12/1
28. NSF - www.nsf.gov
    CAREER program
    * http://www.nsf.gov/home/crssprgm/career/start.htm
    Engineering Division
    * http://www.nsf.gov/home/eng/
29. Private Foundations
    • Office of Naval Research (ONR) and other federal programs
    • NIDRR - The National Institute on Disability and Rehabilitation Research
    http://www.ed.gov/fund/grant/apply/nidrr/index.html
30. Miscellaneous Funding links
    o GrantsNet - http://www.grantsnet.org/
    o Grant writing
    + http://www.research.umich.edu/proposals/PWG/pwgcontents.html
    + Google search for articles
    + Book – Research Proposals: A Guide to Success (Ogden and Goldberg)
31. Industry
    * SBIR mechanism (NSF, NIH)
    * Direct Funding from Companies

## 3.8 The National Science Foundation (NSF)

**Overview**
* Founded in 1950
  * An independent federal agency
  * Responsible for advancing science and engineering
  * Makes merit-based grants and cooperative agreements

- Individual Researchers and groups
- Colleges, Universities
- Other Institutions - public, private, state, local and federal

o 9,800 new awards (success rates are different for different programs)
o success rates are different for different programs

**Funding Opportunities at NSF**
* Individual Programs
o Research, education, center programs
  * Priority Areas (Investment Areas for FY)
o Cross-Programs and Cross-Directorates
  * Cross Disciplinary Areas
o Cross-Programs and Cross-Directorates
  * Interagency Programs
o NSF, and other government agencies
**Award (Grant) Types**
* Individual Investigator Initiated Awards
* Individual Investigator Initiated Awards
* CAREER Awards
* Center Awards
* SBIR/STTR awards
* SGER awards
* Supplements
* Workshops, conferences

**NSF Disciplines and Structure**
1. Biological Sciences (BIO)
  2. Computer and Information Sciences and Engineering (CISE)
  3. Education and Human Resources (EHR)
  4. Engineering (ENG)
* Biomedical Engineering Program
  5. Geosciences (GEO)
  8. Polar Programs
  9. Office of Cyberinfrastructure
  10. Office of International Science and Engineering
  11. Office of Integrative Affairs
**NSF Merit Review Criteria**
Criteria include:

- What is the intellectual merit and quality of the proposed activity?
- What are the broader impacts of the proposed activity?
- What is the intellectual merit of the proposed activity?

**Potential Considerations**
* How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
* How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.)
* To what extent does the proposed activity suggest and explore creative and original concepts?
* How well conceived and organized is the proposed activity?
* Is there sufficient access to resources?
* What are the broader impacts of the proposed activity?
* How well does the activity advance discovery and understanding while promoting teaching, training and learning?
* How well does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
* To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
* Will the results be disseminated broadly to enhance scientific and technological understanding?
* What may be the benefits of the proposed activity to society?

## 3.9 Applying for an NIH Grant

**What is a new investigator?**

- Never had an R01 or equivalent grant from NIH
- For some programs, must be within 10 years of latest degree

**Special programs for early-career scientists**

- Kirschstein-NRSA Individual Fellowships (F32)
- Career Development Awards (K)
- NIH Director's New Innovator Award (DP2)
- NIH Research Supplements to Promote Diversity

**Kirschstein-NRSA Individual Fellowships (F32)**

- Individual postdoctoral research training support
- Must be US citizen, non-citizen national, or US permanent resident at time of award
- Provides stipend and institutional allowance for up to 3 years
- Research supervised by faculty mentor
- http://grants1.nih.gov/training/F_files_nrsa.htm

**Selected Career Development Awards**
* K01 - Mentored Research Scientist Development Award: To provide support and "protected time" (3-5 years) for an intensive, supervised career development experience in the biomedical, behavioral, or clinical sciences leading to research independence
* K02 - Independent Scientist Award: To provide support for newly independent scientists who can demonstrate the need for a period of intensive research focus as a means of enhancing their research careers
* K08 - Mentored Clinical Scientist Development Award: To provide support and "protected time" to individuals with a clinical doctoral degree for an intensive, supervised research career development experience in the fields of biomedical and behavioral research, including translational research
* K25 – Mentored Quantitative Research Development Award: To attract to NIH-relevant research those investigators whose quantitative science and engineering research has thus far not been focused primarily on questions of health and disease

* K99/R00 - Pathway to Independence Award (see next section): To provide an opportunity for promising postdoctoral scientists to receive both mentored and independent research support from the same award

http://grants.nih.gov/training/careerdevelopmentawards.htm

**Pathway to Independence Award (K99/R00)**

* Designed to facilitate a timely transition from a mentored postdoctoral research position to a stable independent research position at an earlier stage than the norm

* Up to 5 years of support consisting of 2 phases

* Phase I provides 1-2 years of mentored support for highly promising, postdoctoral research scientists

* Phase II provides up to 3 years of independent support contingent on securing an independent research position

**NIH Director's New Innovator Award (DP2)**

* To stimulate highly innovative research

* One application receipt period per year

* 10-page application

* Awards provide up to $1.5 million in direct costs for 5 year project period

NIH Research Supplements to Promote Diversity

**NIH Research Supplements to Promote Diversity**

* For individuals from under-represented groups or disadvantaged background

* Provides supplements to R01 and other grant mechanisms to support individuals at various career stages from high school through investigator

http://grants.nih.gov/grants/guide/pa-files/PA-08-190.html

But remember...

**The R01 is still the major source of support for early-career investigators and is the "gold-standard."**

* NIH has set a target for the number of awards to new investigators

* NIH Enhancing Peer Review Report (2008) also recommends

o Establishing an Early Stage Investigator (ESI) designation

o Clustering the reviews of ESI applications

Web resources – Read and ask questions

* NIH Grants Web Site: http://grants.nih.gov/grants/oer.htm – contains many documents explaining grant processes, mechanisms, special programs, tips for writing applications

* Web Site for New Investigators: http://grants.nih.gov/grants/new_investigators/index.htm

* CRISP: http://crisp.cit.nih.gov/ - lets you search abstracts of funded grants

* NIH Guide to Grants and Contracts: http://grants1.nih.gov/grants/guide/index.html – announces special programs and initiatives

* Guidelines for Reviewers: http://cms.csr.nih.gov/ResourcesforApplicants/PolicyProcedureReview+Guidelines/Guidelin - lets you see what reviewers are looking for (note links for review of applications from new investigators and for specific grant mechanisms)

And don't forget...

* Contact NIH program officers – identify from NIH home page http://www.nih.gov/

* Talk to your institution's sponsored research office

* Consult your former advisers and current senior colleagues

## 3.10 References


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- Thackrey, D. University of Michigan's Proposal Writer's Guide. [http://www.research.umich.edu/proposals/pwg/pwgcomplete.html].
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- NSF grant writing article: http://nextwave.sciencemag.org/cgi/content/full/2000/07/06/8

# Chapter 4

# Grant Writing K99/R00 and R01[1]

**Grant Writing: K99/R00 and R01**

Phyllis McBride, Ph.D.
NLM Professional Development
May 10, 2011
AGENDA

- Walk through the web:
  - How to find the R01 parent announcement
  - How to find the R01 application package
- Discuss the R01 Research Project Grant
- Take a break
- Discuss the NIH Pathway to Independence Award
- Discuss strategies for success
- Q&A

WHERE DO I BEGIN?

**Where do I begin? Part 1**

- Establish a logical, organized, consistent process
- Develop a good idea, then refine it into a great idea
- Search for potential funding opportunities
- Learn about the agency mission
  - Ensure that your project aligns with agency's mission
  - Begin an iterative thinking and writing process
  - Discuss your idea with your colleagues
  - Discuss your idea with your program manager!

**Begin early!**

Allow time to become familiar with forms and proposal requirements

- PHS 398 – Proposal proper
  - Downloaded from NIH
- SF424 (R&R) – Administrative information
  - Downloaded from Grants.gov

[1] This content is available online at <http://cnx.org/content/m38302/1.1/>.

- Career Development Award Supplemental Form
  - Downloaded from Grants.gov

Research Project Grant
NIH R01 Parent Application
**Research Project Grant (R01)**

- Stands as the original funding mechanism for NIH
- Award suggests research independence
- PurposeSupports a discrete, specified, circumscribed project related to the stated program interests of one or more NIH institutes or centers
  - 27 Institutes and Centers
    - (http://www.nih.gov/icd/[2] )
  - Each Institute and Center has a specific research agenda
    - Often focuses on particular diseases or body systems

**NIH Institutes and Centers**
**Research Project Grant (R01)**
Key Features

- Unsolicited application
  - Investigator drives the research
- Eligibility
  - Individuals with skills, knowledge, and resources necessary to carry out the proposed research; does not require US citizenship
- Budget
  - Costs appropriate for the project; allows direct costs of $250,000 per year or less
- Project duration
  - Up to five (5) years
- Grant cycle
  - Three opportunities to apply each year

**NIH Standard Due Dates – Competing Applications**
**Application Package (R01)**
**Mandatory Documents (R01)**

- SF424 R&R Cover Component
- SF424 R&R Project/Performance Site Location(s)
- SF424 R&R Other Project Information
- SF424 R&R Senior/Key Person Profile
- PHS398 Cover Page Supplement
- PHS398 Research Strategy
- PHS398 Checklist

**"Optional" Documents (R01)**

- PHS398 Cover Letter
- PHS398 Modular Budget

[2] http://www.nih.gov/icd/

- PHS398 Budget
- R&R Sub-award Budget Attachment(s) Form

**Research Strategy (R01)**

- Introduction
- Specific Aims
- Research Strategy
  - Significance
  - Innovation
  - Approach

**Introduction (R01)**

Required only for resubmission and renewal applications]

**Specific Aims (R01)**

- Limited to one (1) page
- Considered the most important page in the entire application because it may be the only page that reviewers who are not assigned to evaluate your proposal may read
  - Must be able to stand alone
  - Must be clearly written
  - Must generate enthusiasm for the project
- 1st paragraph:
  - Introduce the project
  - Educate the reviewer
  - Identify the gap in the knowledge and why it creates a problem
- 2nd paragraph:
  - State your overall goal for the project
  - Explain your rationale
  - Present your central hypothesis (if possible)
- 3rd paragraph:
  - Describe your qualifications, research environment
- 4th paragraph:
  - 
  - Delineate your specific aims in bullet form
    - To test a stated hypothesis
    - To create a novel design
    - To solve a specific problem
    - To challenge an existing paradigm or clinical practice
    - To address a critical barrier to progress in the field
    - To develop new technology
- 5th paragraph:
  - Highlight the project's innovation, significance, and impact (i.e., short- and long-term benefits)

**Research Strategy (R01)**

- Limited to 12 pages
- Considered the heart of the proposal
- Comprises three required subsections:

  - Significance (1-2 pages)
  - Innovation (2-2$\frac{1}{2}$ pages)
  - Approach (4-6 pages)
- Also includes Preliminary Studies (3 pages)

**Research Strategy – Organization (R01)**

**Research Strategy – Significance (R01)**

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved

**Research Strategy – Innovation (R01)**

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms
- Describe any novel theoretical concepts, approaches, or methodologies, instrumentation, or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions
- Explain any refinements, improvements, or new applications or theoretical concepts, approaches, or methodologies, instrumentation, or interventions

**Research Strategy – Approach (R01)**

- Most important part of the Research Strategy
- Describe the overall strategy, methodology, and analyses to be used to accomplish each specific aim
- Explain how the data will be collected, analyzed, and interpreted, as well as any resource sharing plans, as appropriate
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work
- Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised

**Research Strategy – Prelim Studies (R01)**

- Select the best way to present preliminary studies
  - Include within one of the three main sections, i.e., significance, innovation, or approach
  - Include as a separate section
- Provide an account of only those preliminary studies relevant to the proposed project
- Determine how much preliminary data to include
- Present the results in a logical order
- Cite your own publications, if possible
- State explicitly how the results relate to the proposed project

PATHWAY TO INDEPENDENCE

K99/R00 Parent Announcement

**Pathway to Independence Award (Parent K99/R00)**

**NIH Pathway to Independence (K99/R00)**

- Purpose
  - To facilitate a timely transition from a mentored postdoctoral research position to a stable independent research position with independent NIH or other independent research support at an earlier stage than is currently the norm
- Project period and project costs are divided into two distinct phases
  - Phase 1: Mentored support (2 years)
    - Total cost per year should not exceed $90,000
    - Must commit 75% full-time professional effort (9 months)
    - May spend 25% time teaching, doing clinical work, etc. (3 months)
  - Phase 2: Independent scientist (3 years)
    - Total cost per year should not exceed $249,000
    - Must commit 75% full-time professional effort (9 months)
    - May spend 25% time teaching, doing clinical work, etc. (3 months)
- Eligibility
  - Must have research or clinical doctorate
  -
  - Cannot yet have more than 5 years of post-doctoral research training
  - Cannot yet have a tenure-track assistant professor position (or equivalent)
  - US citizenship or permanent residency is not required
- Mentor
  - Should be full-time faculty at sponsor institution
  - Must have funded research related to selected research topic

**Mandatory Documents (K99/R00)**

- SF 424 (R&R)
  - SF 424 (R&R) Cover Component
  - SF 424 (R&R) Project/Performance Site Locations
  - SF 424 (R&R) Other Project Information
  - SF 424 (R&R) Senior/Key Person
  - SF 424 (R&R) Detailed Budget
- PHS 398
  - PHS 398 Cover Letter
  - PHS 398 Cover Page Supplement
  - PHS 398 Checklist
  - PHS 398 Career Development Award Supplemental Form

**Career Development Award Supplemental Form (K99/R00)**

- Candidate Information (Total of 12 pages)

-
  - Candidate's Background
  - Career Goals and Objectives
  - Career Development/Training Activities During Award Period
  - Research Strategy
- Training in the Responsible Conduct of Research (1 page)
- Mentoring Plan (6 pages)
- Statements of Support from Mentors, etc. (6 pages)

- Environment and Institutional Commitment to Candidate (1 page)

- Research Plan
  - Specific Aims
  - Research Strategy
    - Significance
    - Innovation
    - Approach
    - Also include Preliminary Studies
  - Inclusion Enrollment Report
    - If conducting clinical research
  - Progress Report Publications List
    - For renewal applications only
- Human Subject Sections
  - 
  - Protection of Human Subjects
  - Inclusion of Women and Minorities
  - Targeted/Planned Enrollment
  - Inclusion of Children
- Other Research Plan Sections
  - Vertebrate Animals
  - Select Agent Research
  - Consortium/Contractual Arrangements
  - Resource Sharing Plans
    - Data Sharing Plan
    - Sharing Model Organisms
    - Genome-Wide Association Studies
- AppendixMay include the following in the Appendix:
  - Manuscripts and/or abstracts accepted for publication but not yet published
  - Manuscripts and/or abstracts published, but a free, online, publicly available journal link is not available
  - Patents directly relevant to the project
  - Surveys, questionnaires, and other data collection instruments; clinical protocols and informed consent documents

Strategies for Success

General Tips

**#1 Strategy for Success**

Read the instructions and then read the instructions again!

*The large print giveth and the small print taketh away....*

**Strategies for Success**

- Discuss your research idea with your mentor, colleagues, and program manager
- Request your reference letters early, and talk to your references about what needs to be included in them
- Be realistic
  - Make sure your specific aims can be accomplished within the proposed time

  - Make sure – and explicitly state – that you have the appropriate resources to conduct the research (equipment, lab space)
- Identify yourself as a new investigator
- Organize your application in the required format
- Convey the value of the research in plain language – clear, succinct, and professional
- Be comprehensible to both scientists and the public
- Ensure that your application is complete
- Have zero tolerance for typos and other errors
-
- Relay the potential impact of the research on health
- Think like a reviewer
  - How would you rate your application?
  - Shore up any weak spots before submission

Acknowledgements

The GCC Professional Development Project
is supported by a grant to the
NLM Training Program in
Biomedical Informatics and Computational Biology
from the
National Library of Medicine
Grant #3T15LM007093-19S1

# Chapter 5

# 4. Career Pathways in Biomedical Informatics[1]

A Set of Career Pathways showing:

- Ching Lau,M.D., Ph.D working in a clinical and lab setting
- Jorge Herskovic, M.D., Ph. D. working as an Assistant Professor in Bioinformatics
- Ricardo Flores, M.D. working in a clinical and lab setting
- Hong Zhou, Ph. D. working as Faculty at UCLA
- Kimberly Mankiewicz, Ph. D. working as a Technical Writer
- For Links to other careers scroll to the end of this module

**Ching Lau, M.D., Ph. D.**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/8tSBu4gE5TA?fs=1&hl=en_US&rel=0>

**Figure 5.1:** Ching Lau, M.D., Ph.D. Associate Professor, Baylor College of Medicine.

**Jorge Herskovic, M.D., Ph. D.**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/eRJ2MgBDYIo?fs=1&hl=en_US&rel=0>

**Figure 5.2:** Jorge Herskovic, Ph.D. Assistant Professor in Biomedical informatics at University of Texas, Health Science Center, Houston.

[1] This content is available online at <http://cnx.org/content/m37011/1.11/>.

**Ricardo Flores, M.D.**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/VGRLAwAroIw?fs=1&hl=en_US&rel=0>

**Figure 5.3:** Ricardo Flores, M.D., Baylor College of Medicine.

**Hong Zhou, Ph. D.**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/RBL8wNeP3eg?fs=1&hl=en_US&rel=0>

**Figure 5.4:** Hong Zhou Ph.D., UCLA.

**Kimberly Mankiewicz, Ph. D.**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/ZMhruz_2hCw?fs=1&hl=en_US>

**Figure 5.5:** Kimberly Manckiewicz Ph.D., Technical Writer, UT-Health

**Anonymous Comments:**

- Feb 2011: This young woman definitely offers a lot of useful advice for those that are interested in this field of study. It is good that she speaks in terms that are general enough for a graduate student to find the necessary and proper path to lead them to the right avenues. She is very informative.

## 5.1 Links to Other Possible Career Paths

- Bench to Briefs[2] (Law)
- Regulatory Affiars [3] (Law)
- Science Writers[4]
- Science Education and Outreach [5] (45-min NIH video)
- Science Policy Careers[6] (45-min NIH video)
- Technology Transfer Careers[7] (45-min NIH video)
- Forensic Science Careers[8] (116-min NIH video)
- Public Health Careers [9] (73 min NIH video)

[2] http://www.nature.com/naturejobs/2006/060803/full/nj7102-596a.html
[3] http://videocast.nih.gov/summary.asp?Live=9796
[4] http://www.nasw.org/faq-new-and-aspiring-science-writers
[5] http://videocast.nih.gov/summary.asp?Live=9795
[6] http://videocast.nih.gov/summary.asp?Live=9982
[7] http://videocast.nih.gov/summary.asp?Live=9984
[8] http://videocast.nih.gov/summary.asp?Live=9819
[9] http://videocast.nih.gov/Summary.asp?File=15369

- Science Jobs with the US Government [10]

[10] http://www.makingthedifference.org/federalcareers/biologicalsciences.shtml

# Chapter 6

# 5. Social Fluency[1]

A Glimpse into the workshop is presented here in 3 parts. To view the entire workshop please scroll down and view the full workshop presented below in 5 parts.

**Introduction to Social Fluency**

This media object is a Flash object. Please view or download it at
<http://www.youtube-nocookie.com/v/6mbvhW8-ODI?fs=1&hl=en_US>

**Figure 6.1:** Beth O'Sullivan, Lecturer, Jones School of Management, Rice University.

**The Hand Shake**

This media object is a Flash object. Please view or download it at
<http://www.youtube-nocookie.com/v/zJLu_5fv6W0?fs=1&hl=en_US>

**Figure 6.2:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

**Practicing Social Fluency**

This media object is a Flash object. Please view or download it at
<http://www.youtube-nocookie.com/v/w5aKQo3bXHs?fs=1&hl=en_US>

**Figure 6.3:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

Presented here is the Full Social Fluency Workshop broken into 5 parts:

[1] This content is available online at <http://cnx.org/content/m37016/1.4/>.

**Part 1: Preparing for a Networking Event**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/cG524pm9mqk?fs=1&hl=en_US>

**Figure 6.4:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

**Part 2**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/OIuPkA4ngZw?fs=1&hl=en_US>

**Figure 6.5:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

**Part 3**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/U7fyEzq6Ij4?fs=1&hl=en_US>

**Figure 6.6:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

**Part 4**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/hJqy1mTum9A?fs=1&hl=en_US>

**Figure 6.7:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

**Part 5: Building Your Network Over Time**

This media object is a Flash object. Please view or download it at
<http://www.youtube.com/v/gP2aLevC2Rg?fs=1&hl=en_US>

**Figure 6.8:** Beth O'Sullivan, Senior Lecturer, Jones Graduate School of Business, Rice University.

# Chapter 7

# Professional Associations & Learned Societies in Biomedical Informatics[1]

NOTE:

> *"I cannot emphasize enough the importance of being a member of a professional society. In fact, I found my first senior scientist position via the American Chemical Society's jobs website."*
>
> *- Stacey Kalovidouris, Institute of Biosciences & Bioengineering, Rice University.*

Once a definitive career path has been determined, coming to understand what that entails often leads to the idea of joining a professional society.

There are several advantages to joining a Professional Society or Association in your particular field. While there are many benefits to joining, here are some of the main ones:

- Networking Opportunities – To establish and maintain Professional Relationships, to affiliate with a reputed group.
- Journal – A society is usually associated with one or more journals to which you receive reduced or free subscription. Journals disseminate current advancements in the profession.
- Conference – A society's annual meeting is often a major conference in the field. Members may get registration discounts.
- Listserv for members
- Professional Development
- Finding employment via the society's job board and network
- To impact the profession.

## 7.1 Some Factors to Consider

- Cost of membership
- Unwarranted emails
- Unwanted solicitation
- Location constraints for events
- Presence/absence of a local chapter

[1] This content is available online at <http://cnx.org/content/m37088/1.1/>.

## 7.2 Societies in the broad Biomedical Informatics area:

(Not a comprehensive list)

## 7.3

| | | |
|---|---|---|
| 1 | BioChemistry | American Soc. Biochem. & Mol. Bio.[74] (ASBMB) |
| 2 | Chemistry & nano* | American Chemical Society[75] (ACS) |
| 3 | Peptide Chemistry | American Peptide Society[76] (APS) |
| 4 | Protein science | Protein Society[77] |
| 5 | Microscopy | Microscopy Soc. of America[78] (MSA) |
| 6 | Crystallography | Am. Crystallographic Association[79] (ACA) |
| 7 | Pharmacology | Am. Soc. For Pharma. & Experimental Therapeutics[80] (ASPET) |
| | | |
| 8 | Biothermodynamics | The Gibbs Society[81] |
| 9 | General Biology | Fed. of Am. Soc. for Experimental Biology[82] (FASEB) |
| 10 | Microbiology | Am. Soc. For Microbiology[83] (ASM) |
| 11 | Microbiology | Am. Soc. For Virology[84] (ASV) |
| | | |
| 12 | Cognitive Science (Decision Making/ Problem Solving) | Cognitive Science Society[85] |
| 13 | Experimental Psychology | Psychonomic Society[86] |
| 14 | Neuroscience | Soc. For Neuroscience[87] (SFN) |
| 15 | Vision Research | Assoc. for Research in Vision & Ophthalmology[88] (ARVO) |

*continued on next page*

| | | |
|---|---|---|
| | | |
| 16 | Physics | American Physical Society[89] (APS) |
| 17 | BioPhysics | Biophysical Society[90] (BS) |
| | | |
| | | |
| 18 | Biomedical Informatics | American Medical Informatics Association[91] (AMIA) |
| 19 | Information Processing | International Federation for Information Processing[92] (IFIP) |
| 20 | Technical Communications | Society for Technical Communication[93] (STC) |
| 21 | Human Computer Interaction | Computer-Human Interaction[94] (CHI) |
| 22 | Internet Technologies | International Association of Internet Professionals[95] (IAIP) |
| 23 | Computer Science | Assoc. for Computing Machinery[96] (ACM) |
| 24 | Computational Biology | International Society for Computational Biology[97] (ISCB) |
| 25 | Material Measurement | Material Measurement Laboratory[98] (NIST) |
| 26 | Math/Computation | Soc. for Industrial & Applied Math[99] (SIAM) |
| | | |
| 27 | Engineering | Institution of Engineering and Technology[100] (IET) |
| 28 | Systems Engineering | International Council on Systems Engineering[101] (INCOSE) |
| 29 | Standards Engineering | Standards Engineering Society[102] (SES) |
| 30 | Electrical/Electronics Engineering | Institute of Electrical and Electronics Engineers[103] (IEEE) |

*continued on next page*

| | | |
|---|---|---|
| 31 | Robotics | International Federation of Robotics[104] (IFR) |
| 32 | Photonics | Soc. of Photo-Optical Instrumentation Engineers[105] (SPIE) |
| 33 | Marine Engineering | Institute of Marine Engineering, Science and Technology[106] (IMarEST) |
| 34 | Chemical Engineering | Institution of Chemical Engineers[107] (IChemE) |
| 35 | Biomedical Engineering | Biomedical Engineering Society[108] (BMES) |
| 36 | BioEngineering/CS | Am. Inst. For Medical and Biological Engineering[109] (AIMBE) |

**Table 7.1**

[74] http://www.asbmb.org/
[75] http://portal.acs.org/portal/acs/corg/content
[76] http://www.americanpeptidesociety.org/
[77] http://www.proteinsociety.org/
[78] http://www.microscopy.org/
[79] http://www.amercrystalassn.org/
[80] http://www.aspet.org/
[81] http://mljohnson.pharm.virginia.edu/gibbs-society/gibbs-home.html
[82] http://www.faseb.org/
[83] http://www.asm.org/
[84] http://www.asv.org/
[85] http://cognitivesciencesociety.org/index.html
[86] http://www.psychonomic.org/
[87] http://www.sfn.org/
[88] http://www.arvo.org/eweb/StartPage.aspx?Site=arvo2
[89] http://www.aps.org/
[90] http://www.biophysics.org/
[91] https://www.amia.org/
[92] http://www.ifip.org/homeintro.html
[93] http://www.stc.org/
[94] http://www.sigchi.org/
[95] http://internetprofessionals.org/
[96] http://www.acm.org/
[97] http://www.iscb.org/
[98] http://www.cstl.nist.gov/div831/
[99] http://www.siam.org/
[100] http://www.theiet.org/
[101] http://www.incose.org/
[102] http://www.ses-standards.org/
[103] http://www.ieee.org/index.html
[104] http://www.ifr.org/
[105] http://spie.org/%5D
[106] http://www.imarest.org/
[107] http://www.icheme.org/
[108] http://www.bmes.org/aws/BMES/pt/sp/home_page
[109] http://www.aimbe.org/

# Chapter 8

# Time Management[1]

Time Management
Sujata Krishna
In this module you will learn to:

1. Clarify your goals and steps to attainment of the goal
2. Delegate
3. Deal with issues that take up your time
4. Manage procrastination & Stress

## 8.1 Clarify your goals and steps to attainment of the goal

Ask yourself:

- Why am I doing this?
- What is my goal – over the next 10 years? Over 1 year? Is this your goal or someone elses?
- What do you need to do to succeed? Write this down and make a timeline for attainment. Break it down into small steps that are attainable.
- Make your goal something you can assess - how will you know you attained it?
- Define the resources you need - people, equipment, time etc.
- Identify the potential obstacles in attaining your goal

Failure to plan leads to failure. Plan out your day (in detail), week, semester, year and long term (somewhat more vaguely). You can change these, but you must have a plan.
**Splitting Your Work Time**
You Should aim to spend:

- 80% of your time doing your work towards your goal
- 10% of your time on Professional Development
- 10% of your time on publicizing your work - i.e. writing papers, giving talks, professional networking etc.

Place each task in a Covey's 4 quadrant to-do list:

| | Urgent | Non-urgent |
|---|---|---|
| Important | 1 | 2 |
| Unimportant | 3 | 4 |

[1] This content is available online at <http://cnx.org/content/m37116/1.5/>.

**Table 8.1**

Tackle #1 first, then 2, 3, and 4 in that order.

## 8.2 Delegate

Delegate everything you can to someone else who can do it well. Give them the resources to do it & trust them.

## 8.3 Deal with issues that take up your time

Several issues often take up your valuable time, such as:

- Disordered paperwork – can't find what you are looking for
- Emails, paper requests
- Missed appointments or unpreparedness for meetings
- Tired, unable to concentrate
- People requesting help, volunteering etc.
- Telephone calls where you are on hold

What can you do about it?

- File paperwork away. Focus on one issue at a time.

- Emails: Deal With it Once: if it is a short task, do it now and be done with it
- Learn to say 'No' firmly, but politely. Use 'I'll do it if no one else steps forward.'
- Communicate clearly and follow a conversation up by an email stating the outcomes.
- Never commit immediately. Always ask for time to consider.
- Calls – use the speaker phone so your hands are free.

## 8.4 Manage Procrastination & Stress

- Stress often results from poor time management.
- Good time management leads to success.
- If a task has no deadline, make one up.
- Don't aim for perfection, aim to be good.
- Last minute, rushed jobs cost you. Best to not leave it to the end.

## 8.5 Tools for Time Management

- 1. Time Management Quiz [2] - Use this to discover how good your time management skills are and where you can benefit form improvement.
- 2. Rescue Time [3] is a program that runs in the background on your computer and tracks how much time you spending doing different things. There is a free lite version that lets you see, for example, how much time you spend emailing, or on Facebook etc. A paod subscription enables you to set up time limits on different types of activities.
- 3. LeechBlock [4] will block various sites after time allotments you've given it have been used up. This can help you manage your time.

[2] http://www.ucc.vt.edu/lynch/tmquiz.htm
[3] http://www.rescuetime.com/plans
[4] https://addons.mozilla.org/en-us/firefox/addon/leechblock/

## 8.6 References & Further Reading

1. Randy Pausch's Talk on Time Management[5] , University of Virginia, Nov. 2007.
2. The Seven Habits of Highly Effective People, Stephen Covey, Free Press, 1990 ISBN 0671663984

[5] http://www.youtube.com/watch?v=oTugjssqOT0&feature=relmfu

## Index of Keywords and Terms

**Keywords** are listed by the section with that keyword (page numbers are in parentheses). Keywords do not necessarily appear in the text of the page. They are merely associated with that section. *Ex.* apples, § 1.1 (1) **Terms** are referenced by the page they appear on. *Ex.* apples, 1


**5** 5-minute presentation, § 1(1)

**A** Academia to start up, § 1(1)
Academia to Start-up, § 1(1)
advice to graduates and post-docs,, § 3(29)
Advice to students, § 5(47)
Associations, § 7(53)

**B** Bioinformatics, § 1(1)
Biomedical Informatics, § 5(47)
Bringing an Idea to Market, § 1(1)

**C** Career Awards, § 1(1)
career in biomedical informatics, § 1(1)
Career Pathways, § 1(1), § 1(1)
career,, § 5(47)
Conflict, § 1(1)
Conflict Resolution, § 1(1)
Creativity, § 1(1)
Curricula, § 1(1)
Curriculum Development, § 1(1)

**D** Decision Making, § 1(1)
Developing a lab, § 1(1)

**E** educational, § 1(1)
Elevator Pitch, § 1(1)
Elevator Talks, § 1(1)
Execution, § 1(1)

**F** First Lab, § 1(1)
funding,, § 3(29)

**G** GCC, § 1(1)
Graduate Development, § 1(1), § 1(1)
Graduate level, § 1(1)
Grant Writing, § 1(1)
Grant Writing, K99/R00, R01, NLM, Professional Development, Graduate students, postdocs, Rice, GCC., § 4(39)
grants,, § 3(29)

**I** Independence Grid, § 1(1)
Innovation, § 1(1)
Interview Skills, § 1(1)
Interviewer skills, § 1(1)
Interviewing skills, § 1(1)

**K** K99 R00 R01 R03, § 1(1)
K99/R01, § 1(1)

**L** Leadership, § 1(1)

**M** membership, § 7(53)
Mentor Mentee Expectations, § 1(1)
Mentoring, § 1(1)
Mentoring compact, § 1(1)

**N** Networking, § 1(1), § 6(51)
New Faculty, lab, NLM Professional Development, Advice for graduates and post-doctoral fellows., § 2(23)
NLM, § 1(1), § 8(57)
NLM Professional Development, § 3(29)
NLM Training for graduates, § 1(1)

**O** Open access, § 1(1)
Open Education, § 1(1)

**P** Paradigm, § 1(1)
Planning your career, § 1(1)
Postdoctoral Training, § 1(1)
Poster Design video, § 1(1)
poster presentation, § 1(1)
Professional Development, § 1(1), § 6(51), § 8(57)
Professional Societies, § 1(1), § 7(53)
Publish in Nature, § 1(1)

**R** Resource, § 1(1)
Rice, § 1(1)

**S** Science graduates, § 1(1)
SEtting Up Lab, § 1(1)
Social Fluency, § 1(1), § 6(51)
Social skills, § 6(51)
Specific Aims, § 1(1)
Staffing a Lab, § 1(1)

Strategy, § 1(1)

**T** text, § 1(1)
Time Management, § 1(1), § 8(57)
timeline,, § 3(29)
Timelines, § 1(1)
Trends, § 5(47)

**V** Video, § 1(1)
video,, § 5(47)

**W** Work-life Balance, § 8(57)
Writing a paper for Nature, § 1(1)

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A Professional Development Framework is presented, based on 5 core competencies of Leadership skills, Strategy, Decision Making, Innovation and Execution. This curriculum is being fleshed out bit-by-bit, hence links to various materials are added from time to time as materials become available. Should you wish to participate in this endeavor, please get in touch with the author, Sujata Krishna by emailing her at sk42@rice.edu

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