30.1 OVERALL

Many students seek careers in science hoping to improve people's lives and to find knowledge from which all people can benefit. In fact, a background in science and engineering is becoming fundamental to more and more careers, as science and technology have become more central to modern society. No longer are scientists needed just in research and development. Scientists have become critically important in other fields as well, such as in business, entrepreneurship, law, politics, security, teaching, and more. Scientists and engineers are involved in establishing and running corporations, making laws, setting policies, and communicating with the public. In addition, they consult, fundraise, invest, and lobby. In short, their careers reach far across industries and institutions and cross national boundaries. With the right leadership abilities and communication skills, there is almost no limit to where scientists are needed and can go.

One such essential communication skill is the ability to apply successfully for jobs. To enter into a successful scientific career, or to change jobs and even careers, you need to be familiar with the appropriate documents needed to take this step. These next sections outline the most important documents required for job applications in the scientific and technical fields.

30.2 CURRICULA VITAE (CVs) AND RÉSUMÉS

JOB APPLICATION GUIDELINE 1:
Tailor your CV or résumé specifically to the position and to the organization.

JOB APPLICATION GUIDELINE 2:
Your CV or résumé should be well presented and flawless.

The CV or résumé is typically the first item that a potential employer sees. A *curriculum vitae*, commonly referred to as a CV, is a summary of your educational and academic backgrounds, which is used primarily in academic and medical settings. A résumé is used for seeking employment in the private sector and contains a summary or listing of your relevant job experience and education.

For your CV or résumé, use a common font such as Times, Palatino, or Arial in 12 point. Use underlines, boldface, and italics sparingly, and avoid fancy bullets and other ornaments.

ESL advice

International applicants often write the type of personal information on a *curriculum vitae* that would not be included on an American CV or résumé. When applying for a job position within the United States, provide only your full name along with your address and email. Do not include birthday, marital status, or pictures. Also, do not include a title page.

CVs

CVs are usually very comprehensive and elaborate on professional history including every term of employment, academic credential, publication,

contribution, or significant achievement. Typically, CVs have no length restrictions, but it is essential that your CV is clear, concise, and honest. Your CV should also be well presented and flawless.

The CV should start with basic details including your contact information. After your contact details, include your degrees and training in order of your personal preference. As you gain more and more experience, earn additional degrees, get further training, and hold different jobs, information in your CV will have to be adjusted. It is therefore important to keep updating your CV.

Customize your CV for each job application. Most potential employers will only glance at a CV; therefore, you need to highlight your main qualities on the first page (or two). To make your CV as effective as possible, think about what skills and qualities your potential employer may wish to invest in and why. Then organize and present your information based on the interests of the employer. Ensure that your CV is addressed to the organization to which you are currently applying—not the one to which you applied previously! Check that the address on the letter matches the one on the envelope.

CVs differ widely, depending on personal preference, where you are applying to, and your experience. The following list will give you an example of what categories you may include in your CV and approximately in what order:

- Name & address (no personal information)
- Education, with degrees and dates (most recent dates first)
- Clinical certifications, with dates
- Employment history, brief description & dates; most recent dates first (& brief description)—may also be placed in first position
- Honors and awards (predoctoral and postdoctoral)
- Grant funding
- Leadership and service
- Teaching experience
- Laboratory skills
- Publications—name boldfaced, first authors easily identified
- Invited presentations and seminars
- Professional qualifications
- Certifications and accreditations
- Computer skills
- Language proficiency
- Unique technical abilities
- Professional memberships

Note that in a CV for an academic job, the list of peer-reviewed publications is very important. List only those that are published or accepted for publication and not those submitted or in preparation. Often the applicant's name is in bold in the list of publications to make it immediately visible. List also any currently funded grants (amount, type, length, and agency) that you can bring with you. Such active grants may be extremely important for securing a new position.

The next example shows a sample CV that serves as an example of the appropriate format for a *curriculum vitae*. Note that educational qualifications and work experience are listed in reverse chronological order and account for the job seeker's entire career history.

Example 30-1 Sample CV

JANET MILLER

Address
Telephone and e-mail

EDUCATION

Ph.D. Chemistry; ***University of Utah***

Area of Specialization: biological chemistry 2006

B.S. Chemistry, *cum laude*; ***Washington University of California*** 2001

CAREER/ACADEMIC APPOINTMENT

Associate Professor Yale University, Department of Biological Chemistry, 2008–present

Assistant Professor Brown University, Department of Chemistry, 2004–2008

RESEARCH EXPERIENCE

Postdoctoral Fellow: University of Pennsylvania; laboratory of Dr. Enzo Russo, 2002 – 2004

PROFESSIONAL HONORS AND AWARDS

Fellowship from Institute for Chemical Studies, London	2011
MacDougal Award	2010
DPP Young Investigator Prize	2009
Overseas Research Studentship Award	2001–2003

GRANT FUNDING

Current Grants

Agency:	NIH
ID#:	3 U02 03GM0566490-01S6
Title:	"Structural determination of antibiotic binding sites in the bacterial ribosome."
P.I.:	Janet Miller, Ph.D.
Percent effort:	20%
Direct costs per year:	$xxx
Total costs for project period:	$xxx,xxx
Project period:	07/01/12 – 06/31/17

....

Past Grants

Agency:	MacDougal Award
P.I.:	Janet Miller, Ph.D.

Percent effort: 50%
Total costs for project period: $xxx,xxx
Project period: 2010–2013

. . . .

INVITED SPEAKING ENGAGEMENTS

Synthesis of Y VIIth International Conference on Y. Woods Hole, Massachusetts 2011

. . . .

COURSES

Introductory Biology, University A 2012
Writing in the Sciences, University B 2011

. . . .

PROFESSIONAL SERVICES

Peer Review Groups/Grant Study Sections:

Microbiology Research Committee to review K applications, NIH 2011
Alfred P. Sloan Foundation, NIH *2008–present*

JOURNAL SERVICE

Editorial Board:

Microbiology Reports 2011–present
PLoS ONE 2009–present

Journals:

American Journal of Microbiology, Bulletin of bacteriology, Journal of Parasitology, Journal of Virology, Nature, PLoS Biology 2008–present

. . . .

Publishers:

Springer

Academic Editor:

PLoS Medicine

Professional Service for Professional Organizations:

Advised US Department of Health and Human Service with regard to vaccination policies 2009

. . . .

Meeting Planning/Participation:

Organizer of Bacteriology Workshop at the University of Carabobo, Venezuela 2011
Scientific Advisory Board Member of Workshop *Mitigating the spread of MRSA: lessons learned from past outbreaks*, Arizona State University, Tempe 2010

Yale University Service:

Departmental Committees

Search Committee. Infectious Disease Ecologist Faculty position 2011

Microbiology Thesis Committee member 2010–present

Microbiology PhD, and MPH student orientation 2010

Public Service:

. . . .

PUBLICATIONS

BOOKS

Miller, J. H. "Chemical synthesis—the new era," Oxford University Press, accepted for publication in 2008.

Articles and Book Chapters

Schulz, P.A., **Miller, J. H.,** Hartmann, E. (2008). Title. *Journal of Chemistry* 126: 1–8.

Miller, J. H., Knight, C., Cove, D. (2007). Title. *Science* 261: 92–99

. . . .

ABSTRACTS

Miller, J. H., and Kabe, C.G. (2008). Title. Protein Society abstracts.

. . . .

REFERENCES

available on request

Résumés

In contrast to a CV, a résumé contains only experience directly relevant to a particular position. Your résumé should be tailor-made according to the position for which you intend to apply. It should be job oriented, goal specific, and very concise. Typically, résumés for industry are much shorter than those for academia, between 2 and 4 pages.

Many résumés in today's job market are created, posted, submitted, and searched electronically. This brings with it not only advantages but also some pitfalls. Generally, it is easier and quicker to update and send out résumés electronically. However, beware that if you mass mail your résumé, it may no longer be tailored to a specific job position, which can have a negative effect on your chances of securing employment.

Three different kinds of résumés exist:

Chronological – In a chronological résumé, your education, work history, and accomplishments are formatted in reverse chronological order. This style résumé is considered the easiest to read and write and is your safest choice if you are not sure what style to choose for your job application.

This style is particularly effective if you

- have a steady work history that is consistent with your employment goal.

- continuously increased your level of responsibility, promotions, and accomplishments.
- want to mention any prestigious employer or institution.

The chronological style might not be the right choice for you if you

- have gaps in employment.
- change jobs frequently.
- lack work experience.
- are transitioning to a new career.

In these cases, another résumé style may be more suitable.

Functional – In a functional résumé, no dates are listed. Instead, the résumé focuses more on your skill set than on your history, allowing you to emphasize and showcase specific skill categories and positions held. This style is very effective when the potential employer needs to know about your expertise in a specific field.

Use a functional résumé

- to stress your business's management skills.
- to point out specific abilities.
- if you are just launching your career and don't have a history to draw on.
- if you are an executive who has only held one or two jobs for long periods.
- to re-enter the job market after a long absence.
- if your work history does not show professional growth.

If you use a functional résumé, you can showcase the skills and expertise relevant to the targeted position. However, by not providing dates, you also may raise the suspicion of your potential employer as the omission of dates may alert them to look for gaps in your employment record and question your professional growth.

Combination – This style incorporates characteristics of both the chronological and functional résumés. It allows you to format your information according to your specific situation. The combination résumé usually lists your functional skills and qualifications with brief explanations, followed by reverse chronological listings of current and previous employment, training, publications, and other skills. You can also highlight specific expertise and accomplishments that match the needs of your potential client in these chronological lists.

The combination résumé is best if you

- are looking to change careers and want to highlight the skills that would best match your new career path.
- like the position and believe you will be successful but do not have a strong skill set or much experience in the field.

This format seems to diffuse most suspicions that employers may have while allowing you to highlight your skill sets and past accomplishments that you can bring to the position. Such combination résumés are becoming more and more common in the scientific fields, particularly in private industry.

Overall, know where you are in your career and training before you decide on the best résumé format. Evaluate the position to which you are planning to apply and see what skills and experiences are required. Compare the position's requirements to your skill sets. Based on this comparison, decide which résumé format will be best suited for your application. Ensure that your résumé is targeted toward the position you want, and shows not just your day to day work, but also your accomplishments. In addition, make sure that it looks neat and professional and does not contain any spelling or grammatical errors.

Following are two sample résumés, one chronological, and the other a combination résumé.

Example 30-2

RÉSUMÉ

Peter Jones

CONTACT ADDRESS Address; Telephone; Fax; email

PROFESSIONAL EXPERIENCE

Jul 2006 – to present **Sr. Scientist I/Sr. Investigator II; Bayer Pharmaceuticals**

- Led a research group specialized in biologically active molecule synthesis and custom synthesis
- Managed a process lab for preparation and processing of X
- Investigated quality and stability of drug products for preclinical and clinical trials

Nov 2003 – Jul 2006 **Chemist, Abbott Laboratories**

- Responsible for designing and conducting complex, multistep synthesis
- Synthesized carcinogenic substances for chemical toxicology research

Nov 2000 – Nov 2003 **Postdoctoral Fellow, ABC University**

- Studied biology of carcinogens
- Synthesis of carcinogenic compounds for cancer research

EDUCATION

- 1996: *Ph.D. in Biochemistry,* The University of Chicago
- 1992: *MS in Chemistry,* New York State University
- 1984: *BS in Chemistry,* Summa Cum Laude, Concordia College, Minnesota

AWARDS

2008 Nominee for Concordia College Alumni Achievement Award

2006 Outstanding Achievement Award, Abbott Global Medical Affairs

PROFESSIONAL ACTIVITIES

GRANT SUPPORT

- Ongoing Grants
- Complete Grants

SELECTED PUBLICATIONS

Example 30-3

RÉSUMÉ

John Ips, Ph. D.
Job Announcement Number: 13-758303

11 Street name
SomePlace, CT 06415
Tel (xxx) Fax (xxx)
Email address

SUMMARY

- Highly motivated microbiologist with extensive experience in bacterial genetics
- Highly developed leadership and interpersonal skills
- Broad experience negotiating and supervising contracts with CROs and academic laboratories
- Excellent skills in NMR, HPLC, IR, UV
- Excellent team player with good verbal and written communication skills

EDUCATION AND TRAINING

- Jul. Dec.
- 2004 – 2007: **Postdoctoral Fellow**
  University of Munich, Germany
- 2004: **Ph.D., Biochemistry** (Magna cum Laude)
  Humboldt University, Berlin, Germany

PROFESSIONAL EXPERIENCE

2012 *Pfizer, Groton, Connecticut*
Current **Director**, Biomedical Research & Development
Main focus: Development of rapid diagnostics devices

- Responsible for strategic planning and development of biomedical programs
- Laboratory management and accreditation

2007 – 2011 *Rib-X Pharmaceuticals Inc., New Haven, Connecticut*
2008 – 2011 **Sr. Director, Ribosomal** Targeting and New Technologies
2004 – 2008 **Director** Discovery Biology
Main focus: Drug Discovery and Development

- Lead the Discovery Biology team and a Target Exploration team
- Effectively guided development of assays needed to validate mechanism of action and functional target location for discovery programs

- Key member of leadership team that planned and directed the research strategies and activities

PUBLICATIONS

Selected articles:

- Joseph, E., McConnell, T., DeRey, J., Lance, L., **Ips, J.A.** A new family of linezolids. *Journal of Bacteriology* 52: 3550-3557 (2012).
- Lance, L., Daese, P., DeRey, J., **Ips, J.A.** *In vitro* activities of oxazolidinones. *Journal of C.* 2: 1653-1662 (2011).
- **Ips, J.A.**, Kano, Z.F., Wan, D. Crystal structure of linezolid. *Journal of Medicinal Chemistry* 335: 3-13 (2010).
- ....

MEETINGS AND CONGRESSES

Selected presentations:

- 2012 Antibiotic Development, San Diego, CA
- 2011 Oxazolidinones, Washington D.C.

....

PROFESSIONAL SERVICES

- **since 2009 Scientific Editor of Journal Z**
- **2007– 2012 Reviewer for the following journals:** Journal of Bacteriology, Journal of Z...

PROFESSIONAL MEMBERSHIPS

- American Society of Microbiology
- American Society for Biochemistry and Molecular Biology

FOREIGN LANGUAGES

- Fluent – Spanish and German

30.3 COVER LETTERS

JOB APPLICATION GUIDELINE 3:

Tailor the cover letter specifically to the position.

When you are applying for a job, you will not only have to send a CV or résumé but also a cover letter. Your cover letter creates a professional impression from the outset. Like the CV, it should be flawless, as it can make or break your application. In your cover letter, highlight the most relevant parts of your CV that can show your potential employer what you can do for them. Wherever possible, address your cover letter to a specific person, even if that means you have to call the organization. Check (and double-check) the letter for spelling and grammatical errors. If you are sending a hard copy, print it onto good quality paper.

The cover letter should be tailored specifically to the position and should be 1 to 1.5 pages long. After introducing yourself, highlight your accomplishments and state your research goal. Then state why you believe

your expertise would add to the department to which you are applying. Here is an outline for the general organization of a cover letter:

- Opening paragraph
  - State the purpose of your letter
  - Mention how you heard about the job
- Middle paragraph(s)
  - Highlight your past accomplishments
  - Describe your research goals
  - Explain why you believe you are a good fit for the position
- Closing paragraph
  - Mention any enclosures (CV, publication samples, Teaching Statement, etc.)
  - Make positive closing remarks

Example 30-4 shows a sample cover letter for an academic position, while Example 30-5 presents an example of a cover letter for a position in private industry. Both follow the outline given previously.

Example 30-4 Cover Letter for an Academic Position

Date

Dear Prof. Ying:

Purpose and name of position

I am writing to apply for the Assistant Professor position in your Department as posted in the October 10th issue of *Science*. I am convinced that my solid training in X-ray crystallography, my strong track record in cutting-edge research, and my long-standing passion for teaching make me well-suited for the position outlined in your advertisement

Accomplishments and goals

In 2010, I completed my graduate studies at the University of California, San Francisco with a Ph.D. degree in biochemistry. Subsequently, I spent two years in Dr. Hannes Kari's group at the ABC University School of Medicine as a postdoctoral fellow, focusing mainly on structure function studies of the ribosomal protein Y. During this period, I was part of a team actively involved in solving several crystal structures of protein complexes involving this protein for several different organisms (see enclosed publications.) My current research is focused on . . .

Reason for fit

The research and mission of your institute highly complements my own goals and objectives, and my expertise would add to your department's strength in molecular and structural mechanisms of biological processes. It would be an honor to join the University of Tennessee as an assistant professor, and I believe that my skills and talents will be a valuable asset for the University. In addition to leading my own laboratory, I am very enthusiastic about teaching, in which I have been actively engaged for the past four years. Classes that I have taught and which may be of particular interest to your department include . . .

Enclosures and ending on positive note

Please find enclosed my *curriculum vitae*, Research and Teaching Statements, as well as three of my recent publications. The contact information for my references is included in my *curriculum vitae*, and letters of recommendation will be arriving under separate cover. Thank you for your consideration. I look forward to hearing from you.

Sincerely yours,

John Smith, Ph.D.

Enclosed: CV, Research Statement, Teaching Statement, Publications (3)

Example 30-5 Cover Letter for Private Industry

Re: Your posting for Senior Director of Biochemistry

May 15, 2013

Dear Dr. Pederson:

With great interest I have learned about the Senior Director of Biochemistry position listed on your website, and I am excited to apply for the same.

As will also be apparent from my résumé, my 20+ years of comprehensive research and leadership experience encompassing the biochemical sector affords me an excellent perspective to understand the needs of the posted position. In 2002, I joined XXX Pharmaceuticals where I stayed until December 2011 as the Assistant Director of Chemical Biology, overseeing a team of four research scientists. During my time as the Director of the discovery biology department, one novel antibiotic molecule was progressed from discovery into the clinic.

In early 2011, I was promoted to Associate Director for Biomedical Research and Development, and in July 2012 accepted a position of Director of Biochemistry at AAA LLC, a startup company that aims to develop a novel approach to improve dramatically the sensitivity of quantifying and identifying microbial pathogens in food, clinical, and/or environmental samples.

Overall, my career path has provided me the opportunity to be personally involved in all challenges associated with promoting, funding, and directing research. At the same time, I also gained solid expertise on turning basic science and early drug discovery efforts into compounds and devices for clinical development.

I would greatly look forward to working as a Senior Director of Biochemistry in your corporation, a position that has always been of the highest interest to me. I am confident that my experience, expertise, and enthusiasm for this position, and the field of health sciences generally, will be a great asset in stimulating, planning, directing, and evaluating of research projects and programs.

Sincerely

Tammy Wang

30.4 ACCOMPANYING DOCUMENTS

Aside from a cover letter and CV or résumé, you may be asked to send a Research Statement, a Teaching Statement, and letters of recommendation. These documents together will tell your potential employer about your education, skills, and expertise.

Research and Teaching Statements are components of many academic job applications for the life sciences and social sciences. A Research Statement summarizes your research achievements and proposes future studies. A Teaching Statement summarizes your teaching achievements, describes your teaching philosophy, and proposes planned courses or other educational components. These statements are usually requested for postdoctoral and faculty positions and are announced in academic job postings.

Even if you are not requested to write a Research or Teaching Statement, consider doing so, as writing them will help you focus your professional goals and improve your interview performance. For your potential employer, these statements, along with your CV, cover letter, and letters of recommendation, are important indications of your job readiness, your areas of specialty, your potential to get grants, your academic ability and research needs, as well as your compatibility with the department or school to which you are applying.

Each scientific field has different expectations for Research and Teaching Statements. It is therefore a good idea to obtain examples of statements. Such examples may be hard to come by, as many researchers consider them confidential information, especially in a competitive field. Try searching online for examples, but also do not hesitate to ask your advisor or other people in your department.

As with all other types of written communication, revise repeatedly, and have someone else read and comment on your statement(s) before you apply. These statements are very important, as they can make or break a job application. They should be written with great care and revised several times before you send them out.

30.5 RESEARCH STATEMENTS

RESEARCH STATEMENT GUIDELINE 1:

State your research achievements, current aims, and future goals.

RESEARCH STATEMENT GUIDELINE 2:

General Components

(Abstract)

Background

Current research

Research agenda

Relevance

RESEARCH STATEMENT GUIDELINE 3:
Tailor your Research Statement to a particular job posting and institution.

A Research Statement summarizes your research achievements to date, indicates your current aims, and states your future goals. It also describes how your research contributes to the field. The Research Statement should convince potential employers that you are knowledgeable and expert enough to carry out the proposed research. It should also show that your research will be different, important, and innovative. Like the CV and cover letter, your research statement should be tailored to a particular job posting and institution.

Components and Format

The amount of detail and length of Research Statements vary among disciplines. Usually, Research Statements include an overview of your research, background information to show you are on top of your field, key issues remaining in the field, what directions you intend to take to contribute to the field, and why you are motivated to pursue these studies. Your statement may also include a brief abstract, although its inclusion is not required; and mention how you will incorporate graduate and undergraduate students in your research projects.

On average, Research Statements are about two to five pages long, and content is logically divided using headings and subheadings. Bullets and figures can also be found in these statements. The following list provides an outline for the different sections of a Research Statement:

Abstract (optional)	sometimes useful, but not required; provide an overview of your research and proposed plans; include background, overall objective, focus of work, approach, and significance.
Background	give context to your research efforts and describe relevant past research important in your future professional plans; keep the "big picture" in mind.
Current research	describe key findings and their importance as well as current promising lines of inquiry
Research agenda (3–5 year)	state your short- and long-term goals, approaches, and expected outcomes; provide your top 2 or 3 research questions/specific aims/hypotheses; proposed plans should be specific, credible, and realistic.
Relevance	indicate your studies' relevance to your field, potential employer, and to society

The following example shows a Research Statement that has been constructed based on the outline above:

Example 30-6

Research Statement

John Smith

Previous Research

Research focus

I have a long-standing interest in the molecular determinants for axon outgrowth in the central nervous system. While my Ph.D. thesis and earlier postdoctoral work focused on cell motility and cell-matrix adhesion, my years as an Associate Research Scientist centered on the mechanism by which CNS myelin inhibits axon outgrowth.

Previous research

During my graduate studies in the Lineberger Cancer Center at the University of North Carolina, Chapel Hill, I studied the regulation of Rho family GTPases in response to extracellular matrix and growth factor signals. As a postdoctoral fellow at Yale University, I studied the molecular determinants for axon outgrowth in the central nervous system (CNS).

Current research findings

In my current postdoctoral work at Harvard University, I have focused on determining the mechanism by which CNS myelin inhibit axon outgrowth.... We have elucidated NgR-ligand interactions at the molecular level, and this will allow us to develop peptide antagonists to disrupt this receptor-ligand interaction and thereby promote axon regeneration after injury.

Future Research

Specific aims and expected outcome

I. Identify mutations in NgR that increase risk for schizophrenia. These specific NgR mutants fail to transduce myelin signals and function as dominant negatives for endogenous NgR (Budel et al., submitted). I aim to determine the underlying mechanism for NgR signaling in humans, particularly in the case of schizophrenia. Our findings may aid in the development of NgR antagonists, thereby allowing axon regeneration after injury (Li et al., 2004).

II. Determine NgR interactions and effects on other cellular pathways ....

Overall objective and significance

Overall, my ultimate goal is to determine the roles of these mechanisms in distinct neuropsychiatric disorders and work toward the application of these findings to the recovery of a damaged neural system .... I take a strong experimental and collaborative approach to addressing these questions ....

Collaborations

Both of the above projects are collaborative, which I find the most productive (and enjoyable!) manner in which to further scientific understanding. In my current position at Harvard, I also initiated a collaboration with a geneticist to investigate .... I would bring this approach to ABC University and use it to address questions related to ....

Relevance

As a young faculty member, I will successfully synergize my neuroanatomical, developmental, molecular, cellular, biochemical, and functional neuroscience background with new

multidisciplinary approaches to tackle novel mechanisms in the formation of circuits of distinct subpopulations neurons.

Cited literature

Literature

(Betty Liu, research statement, modified)

An alternate possible outline is the following:

Overview/Abstract
- Background/Context
- Overall objective
- Focus of work/Specific aims
- Overall approach
- Significance

Individual research projects

List individual projects/aims and for each:
- rationale
- research aim and approach
- expected outcome
- relevance to institution/department

Overall significance of research

An example of a Research Statement that is composed based on the alternate outline is shown next. The individual components for this Research Statement are indicated.

Example 30-7

Research Statement

Jane Smith

Overview

Background

Air pollution changes our planet's climate, but different types of air pollution have different effects. Sunlight is absorbed by industrial air pollution and by the smoke of burning wood. In turn, this absorption decreases cloud formation and heats the atmosphere (Koren et al., 2004). My research aims to advance our knowledge of cloud formation in response to pollutants based on mathematical modeling. In particular, I am interested in gaining insight into general effects of atmospheric pollutants on precipitation and climate change. The study of cloud fraction in response to pollutants may provide important insights to explain how weather is affected and why our planet has warmed markedly in the past hundred years.

Overall objective and experimental approach

Specific focus

Significance

Individual Research Projects

1. Cumulus cloud formation and atmospheric pollutants
Collaborators: names
Funding: name

Rationale

Clouds are sensitive to land and water surface properties. Satellite images have shown that cumulus cloud formation over the Amazon is affected by heavy air pollution. The Amazon

Rationale	region is generally stable meteorologically as is its cloud formation. Thus, the region provides an ideal model to investigate the effect of smoke from wood burning on the formation of clouds (Koren et al., 2004). . . .
Specific aim and expected outcome	My research aims to determine . . . Findings will allows us to gain insight into . . .
Collaboration and funding	2. *Atmospheric pollutant effect in evaluating climate forcing* *Collaborators: names* *Funding: name*
Rationale	Atmospheric pollution causes cloud formation with more numerous but smaller droplets, leading to less precipitation and longer cloud lifetime. Atmospheric pollutants also absorbed incoming solar radiation, however, which can reduce the cloud cover.
Specific aim and expected outcome	My research applies these ideas to a combination of different models and data assimilations to understand . . . . The energetics will provide a diagnostic tool for assessing . . . .
	Overall Significance of Research
Significance	Mathematical modeling will advance our understanding of the effects of atmospheric pollutants on precipitation and climate change. Through the study of cloud formation and climate forcing, this interdisciplinary research will have important impacts on . . . .

Discuss and coordinate future research themes and strategies with your mentor. Be sure to represent yourself as an independent researcher, with different goals and achievements than your dissertation advisor. Include anything else that might set you apart from your peers (e.g., publications in top journals, important funding partners or collaborators, or breakthrough studies in a particular area of your interests). To be competitive in research today, you generally need a network. If applicable, indicate that you have established collaborations with various researchers across diverse disciplines.

It may also be helpful to point out potential collaborations that could be established with faculty at the department/university to which you are applying. However, do not claim such collaborations unless collaborators have agreed to them. In addition, and if applicable, mention funding organizations likely to support your research agenda and alternative projects showing the breadth of your interests. For candidates who are more senior, future goals are an expanded Specific Aims page as required for grant application.

What Do Job Committees Look for?

To create a strong and compelling Research Statement, consider the goals and facilities of the school you are applying to. Overly ambitious proposals, lack of a clear direction, and unclear significance of study usually result in a weak statement. Write as clearly and precisely as you can, adhering to the basic writing rules and guidelines presented in earlier chapters (see Chapters 1–6). Job committees typically look for the following:

Specific teaching goal	I plan to encourage them not only to work on their research project but also to develop their own ideas of research to pursue as independent investigators. In this regard, I will ask students to present quarterly research plans to the group and . . . Furthermore, I will require them to gain teaching experience through presenting a lecture or two in a course attended by both undergraduate and graduate students. . . .
Summary	In summary, I am committed to becoming an effective teacher with the goal of preparing my students with a solid foundation of knowledge, skills, and enthusiasm they will need to succeed professionally.

Teaching Portfolio

A Teaching Statement may be tied to a Teaching Portfolio. Such a portfolio is a collection of materials that illustrate your teaching strengths and accomplishments. This portfolio may or may not be required in the initial job application package. If it is not required initially, you may be asked to provide one later in the screening process. Be prepared for this request. It takes time to put a good portfolio together.

The contents and presentation of teaching portfolios vary widely from individual to individual and from field to field. A teaching portfolio may include, for example,

- Teaching Statement
- List of courses taught
- List of teaching awards and certificates
- Sample course material including a sample syllabus for a course
- Teaching evaluations by students and faculty members
- List of professional development in teaching
- Graded papers
- Teaching video

30.7 RESOURCES

Resources for Composing Research Statements

Electronic resources for composing a Research Statement include the following (last accessed October, 2013):

http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/1820/writing_a_research_plan
http://www.otal.umd.edu/~sies/jobchecklist.html

Resources for Composing Teaching Statements

http://studentaffairs.duke.edu/career/graduate-students/academic-career-preparation/teaching-statement

http://chronicle.com/article/How-to-Write-a-Statement-of/45133
http://www.washington.edu/teaching/
http://www.londonmet.ac.uk/deliberations/portfolios/iced-workshop/seldin-book.cfm

Printed Resources

Mary Morris Heiberger and Julia Miller Vick, 2008. *The Academic Job Search Handbook* (4th ed.), University of Pennsylvania Press

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30.8 LETTERS OF RECOMMENDATION

LETTER OF RECOMMENDATION GUIDELINE 1:
In the letter of recommendation, highlight only positive qualities.

LETTER OF RECOMMENDATION GUIDELINE 2:
Pay particular attention to the first sentence of the letter of recommendation.

LETTER OF RECOMMENDATION GUIDELINE 3:
Make a letter of recommendation three to four paragraphs long.

Requesting a Letter of Recommendation

Along with your CV, cover letter, and Research and Teaching Statements, you will probably need one or more letters of recommendation to secure a good position. When you have to ask someone for a letter of recommendation, explain exactly why the letter is needed and how important it is to you. Always offer to provide information that makes the writing task easier (CV, list of accomplishments, publication list, the due date, means of transmission [mail or email], correct address of recipient). Also provide the recommender with a brief statement explaining *why* this opportunity is important to you and *how* it fits into your overall research or teaching plan. If the writer cannot or will not provide you with a letter, accept this decline gracefully.

Plan your request. Ask someone who is familiar with your work and knows you well enough to include details about you as a person on the

letter. The writer should ideally write well, have experience composing letters of recommendation, and have the highest or most relevant job title. As a general rule, request your letter at least a month or two in advance. Also send with your request your CV and other documentation of work or service relevant to the position to which you plan to apply so that your letter writer has some material with which to work. If the recommender agrees to writing the letter in general but has a busy schedule, consider offering to write a first draft yourself, which you can subsequently pass on to the recommender.

Writing a Letter of Recommendation

There may be times when you are asked to write a letter of recommendation. Writing such a letter can be a privilege or a task. Agree to write a letter only for someone you know well enough and only if you can really write a supportive letter. It is important that you have a good understanding of the person's academic or professional history and goals. This letter will be important for the individual who has asked you to provide this recommendation. If you are honored to be approached, ask the person for a copy of their résumé or CV and a list of accomplishments to give you guidelines to use in composing the letter. This information is especially important if you are not sure what to say. Also ask for information on the job position to tailor the recommendation to that position. Describe the person truthfully. Highlight only positive qualities. The more personalized the letter of recommendation is, the more effective it will be.

If possible, use formal letterhead and include your title on the signature line to reinforce your credibility.

Content

Letters of recommendation not only confirm a candidate's abilities and experiences, they also can provide insight into the candidate's overall character and work ethic. Above all, letters of recommendation build credibility.

The content of a letter of recommendation should be geared toward the particular job position to which the person is applying and should address any specific questions from the selection committee or hiring manager. In writing letters of recommendation, it is extremely important to impress on the reader that you know this person very well. Avoid a long list of general praises. Instead, comment on the unique personality/traits that the individual exhibits.

A good letter of recommendation can take a substantial time to write. It should be a couple paragraphs in length and contain some or all of the following:

For a student

- Academic performance
- Honors and awards

- Initiative, dedication, integrity, reliability, etc.
- Willingness to follow school policy
- Ability to work with others
- Ability to work independently

For a researcher

- Previous position
- Summary of job responsibilities
- Strengths, skills, and talents
- Initiative, dedication, integrity, reliability, etc.
- Ability to work with a team
- Ability to work independently

Format

Here are some general guidelines for the format of a letter of recommendation:

1st Paragraph	Introduce yourself as the recommender and state the purpose of the letter. State how long you have known the person and in what capacity.
2nd/3rd Paragraph	Start by describing the person in general terms, and then mention specific traits of the person. Give specific examples, and make it relevant to the position being pursued. Include two or three outstanding attributes. Address specific qualities in order of importance.
4th Paragraph	Express your specific recommendation and confidence in the individual. Offer to answer any questions and to provide further information if needed.

You may also want to provide a phone number or e-mail address so employers can follow up if they have questions or want more information.

Pay particular attention to the first sentence of the letter. Its wording will communicate your overall opinion of the individual (often unconsciously). Here are some examples of opening sentences and their respective strengths:

	Strength of opening sentence
This letter pertains to ...	weakest
I am pleased to recommend ...	
It is a pleasure to write this letter of recommendation for ...	
It is a genuine pleasure and honor for me to recommend ...	strongest

Example 30-10

Letterhead
Name and address

Date

Dear Dr. Smith:

It is with the greatest pleasure that I write this letter of recommendation for Maria Miller. Maria has been working as a postdoctoral fellow in my laboratory at the ABC University since July 2007.

I have been the laboratory head and chair of the department of epidemiology since 2001. Without hesitation, I can say that the expertise, efficiency, and professionalism shown by Maria in her research were surely among the best. These qualities are reflected in her successful publication record in top scientific journals. Her postdoctoral years at ABC University have been very productive. She has published excellent articles on various worldwide epidemics such as TB, HIV, influenza, and rubella. Maria also produced the first model on WNV transmission. Her research is often methodologically innovative and has important implications for public policy.

Maria developed several new techniques in my laboratory and was sought out by her lab mates to help them when their assays did not work. She was always able to ask insightful questions in Departmental Seminars covering a very wide range of topics and was never afraid of making a mistake, plunging right into difficult experiments. Moreover, Maria is gifted with superb written and oral communication skills. She kept a well-organized lab book, wrote up her research promptly and clearly, and produced great figures and posters. She also presented outstanding departmental and conference talks.

While working in my laboratory, Maria advanced her knowledge wherever possible by attending lectures whenever her schedule permitted her to do so. For example, she participated in courses at the School of Medicine on virology and microbiology and collaborated with a number of individuals within these fields. Maria was usually the first in my laboratory every morning, and we all enjoyed the collegiality and enthusiasm that she brought to my laboratory and department. She was always cheerful and ready to help, no matter the task.

In short, I recommend Maria without hesitation and have no doubt that this talented young investigator will succeed in the field of epidemiology. I am confident that her research will result in important contributions to your department. Please do not hesitate to contact me if I can provide any additional information that may be helpful.

Sincerely,