Mentoring Plans for Postdoctoral Associates

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Joint Annual Meeting
Human Resource Development

National Postdoctoral Association

The mission of the National Postdoctoral Association is to advance the U.S. research enterprise by maximizing the effectiveness of the research community and enhancing the quality of the postdoctoral experience for all participants.

National Postdoctoral Association

- Established with the support of the American Association for the Advancement of Science (AAAS) and the Alfred P. Sloan Foundation
- Headquartered in Washington, D.C.
- 501(c)3 non-profit organization
- www.nationalpostdoc.org

National Postdoctoral Association

- 170+ Sustaining Members (institutions) representing 40,000+ postdocs
- 3,700+ Individual Members, Regular or Affiliate
  - Postdoctoral scholars and administrators at member institutions receive Affiliate Membership free.
- Another 4,000+ subscribers

NSF/NIH Definition of a “Postdoc”

- **An individual who has received a doctoral degree (or equivalent) and is engaged in a temporary and defined period of mentored advanced training to enhance the professional skills and research independence needed to pursue his or her chosen career path.**

Mentoring Required

- **The 2007 America COMPETES Act requires that all NSF grant proposals that include support for postdocs must contain a description of mentoring activities.**
  - **Effective for proposals submitted on or after January 5, 2009**
  - **Revised procedure implemented for proposals submitted on or after April 6, 2009.**

Why is mentoring needed for postdoctoral scholars?

Postdoctoral Scholars Today

- 89,000 in U.S. (estimate)*
- 60% international (estimate)*
- $38,000 median annual income**
- 51 hours, average work week**
- Early 30s and in a relationship; 1/3 have children**
  - 64% of women versus 70% of men in relationship
  - 29% of women have children versus 37% of men
  - 87% of women have spouses who are employed versus 58% for men

Sources:

*National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

**Sigma Xi 2004-2005 Postdoc Survey

Postdoctoral Scholars Today

- **How many postdocs who earn their degree in the United States are women?**

1996	**29%**
2006	**33%**

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering, 1996 and 2006.

Sigma Xi	**42%**
Citizens/residents	**51%**
Visa holders	**35%**

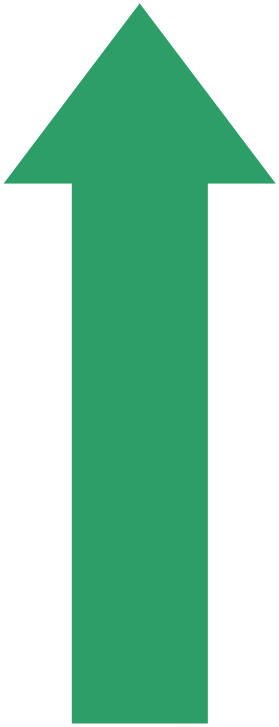
Postdoctoral Scholars Today

Where do they go after the postdoc?

Business/Industry	**41%**
Government	**9%**
Education	**49%**

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients: 2006.

Postdoctoral Scholars Today

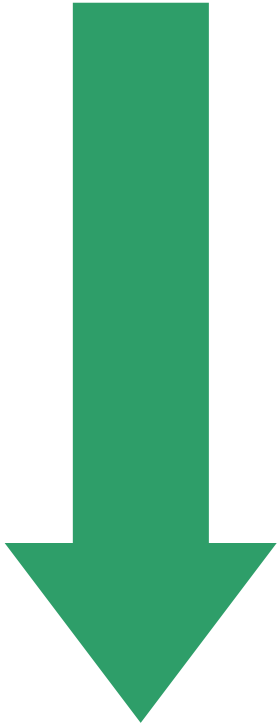


Science & Engineering Ph.D. holders reporting that they had a postdoc:

Before 1972	**31%**
2002-2005	**46%**

Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Postdoctoral Scholars Today



Recent doctorate holders hired into full-time faculty positions

1973	**74%**
2006	**38%**

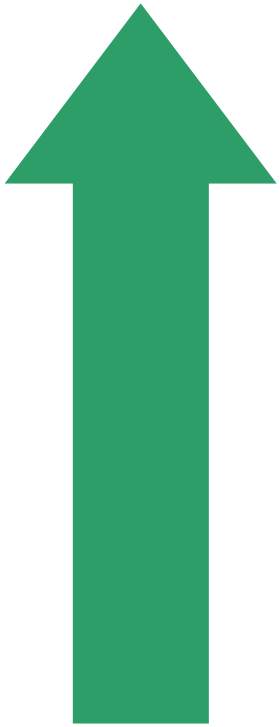
Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Postdoctoral Scholars Today

"Recent S&E doctorate holders who entered academic employment at research universities were more likely to be in postdoc than in faculty positions."

Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Postdoctoral Scholars Today



Science & Engineering postdocs with temporary visas at U.S. universities

1985	8,900
2005	27,000

Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Women & the Postdoc

- **According to the 2007 COSEPUP study:**
  - **"Women constitute about half of the total workforce in the United States and half of the degree recipients in a number of scientific fields."**
  - **But, "women make up only one-fifth of the nation's scientific and technical workers."**
  - **"At every academic career milestone the proportion of women in science and engineering declines." (2003 data)**
  - **"In examining the transition into academic positions, the declines are greatest in fields requiring a period of postdoctoral study, namely life sciences, chemistry, and mathematics."**

Women & the Postdoc

- According to a 2004 NSF study, women who are 8 or 9 years out from earning their Ph.D. are about 5.9% less likely to be tenured than men (as reported in *Gender Differences at Critical Transitions in the Careers of Science, Engineering and Mathematics Faculty*, 2009*).*
- After 14-15 years, women are 14% less likely to become full professor then men.
- According to a 1999 report (Nerad and Cerny, 1999-PhDs-Ten years later), women tend to spend more time as postdocs than men, leading to a delayed entrance into the tenure-track.

Minorities & the Postdoc

- **Sigma Xi Postdoc Survey Project**

White	75%
Asian	17%
Hispanic/Latino	4%
Black/African-American	4%
Citizens/Residents	46%
International	54%

Academic Employment Today

- **"Underrepresented minorities constituted a smaller share of total employment at research universities than at other academic institutions."**
- **Underrepresented minorities represent only 8 to 10% of total academic employment.**

Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Grant Funding

"The share of all NSF grants awarded to new principal investigators (PIs) remained relatively constant from 2002 to 2006, at roughly 27%–28%, while the number of proposal submissions from both new and prior investigators increased and the funding rate both per PI and per proposal decreased."

Source: National Science Foundation Division of Science Resource Statistics. (January 2008). *Science and engineering indicators 2008*. Arlington, VA: National Science Board.

Mentoring

- **The Sigma Xi Postdoc Survey found that postdocs at institutions with structured administrative oversight tend to have higher rates of productivity and satisfaction and lower rates of conflict with colleagues and supervisors.**

Summary

Doctorate-holders in postdoc positions

Length of time spent as postdoc

International postdoctoral scholars

Grant submissions

Productivity/satisfaction w/ mentoring

Conflict w/ mentoring

Funding per proposal/PI

Employment of postdocs in full-time faculty positions

71% of postdocs are supported by or receive federal funding

What role does/should the postdoc play in increasing faculty diversity?

How does/can the postdoc affect women pursuing STEM careers?

Improving the Postdoc Experience

- Increase Federal funding and review funding guidelines.
- Emphasize professional and career development.
- Improve efforts to serve international postdocs.
- Encourage and facilitate diversity within the postdoctoral community.

From Postdoc to Faculty: Transition Issues for Women Scientists

- NPA project supported by a grant from the National Science Foundation's ADVANCE program
- Foster the transition of women postdocs into the professoriate
- Adapt and disseminate promising institutional practices for assisting women scientists and engineers in making this transition
- National Summit on Gender and the Postdoctorate tentatively set for March 10-11, 2010

NSF Grant Proposal Guide

For grants submitted after April 6, 2009

- As per Chapter II Section C2(j)
- Each Postdoctoral Researcher Mentoring Plan must include a supplementary document that describes mentoring activities.
  - No longer than one page.
- Mentoring must be provided to ALL postdoctoral researchers supported by the project, including those at sub-awardees or partner organizations.
  - For collaborative proposals, see GPG Chapter II.D.4
  - Only ONE mentoring plan may be submitted for the entire project.

NSF Grant Proposal Guide

For grants submitted after April 6, 2009

- **Examples of mentoring activities include, but are not limited to:**
  - **Career counseling**
  - **Training in preparation of grant proposals, publications and presentations**
  - **Guidance on ways to improve teaching and mentoring skills**
  - **Guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas**
  - **Training in responsible professional practices.**

NSF Grant Proposal Guide

For grants submitted after April 6, 2009

- **The proposed mentoring activities will be evaluated as part of the merit review process under the Foundation's broader impacts merit review criterion.**
- **Proposals that include funding to support postdoctoral researchers, and, do not include the requisite mentoring plan will be returned WITHOUT REVIEW (see GPG Chapter IV.B.)**

NPA Mentoring Toolkit

- Katy Flint Ehm, Ph.D., first author
- NPA members, including PIs, were consulted and made significant contributions to the final product
- Special thanks to Phil Clifford, Ph.D., from the Medical College of Wisconsin and Richard Lombardo, Ph.D., from the University of Nebraska-Lincoln

Disclaimer

- **Please note: The recommendations and suggestions for mentoring plans made herein have not been endorsed by the NSF or any other government organization. The National Postdoctoral Association (NPA) is providing this toolkit of best practices as a service to its members.**

What is mentoring?

What is mentoring?

Mentoring is a brain to pick, an ear to listen, and a push in the right direction. – John Crosby

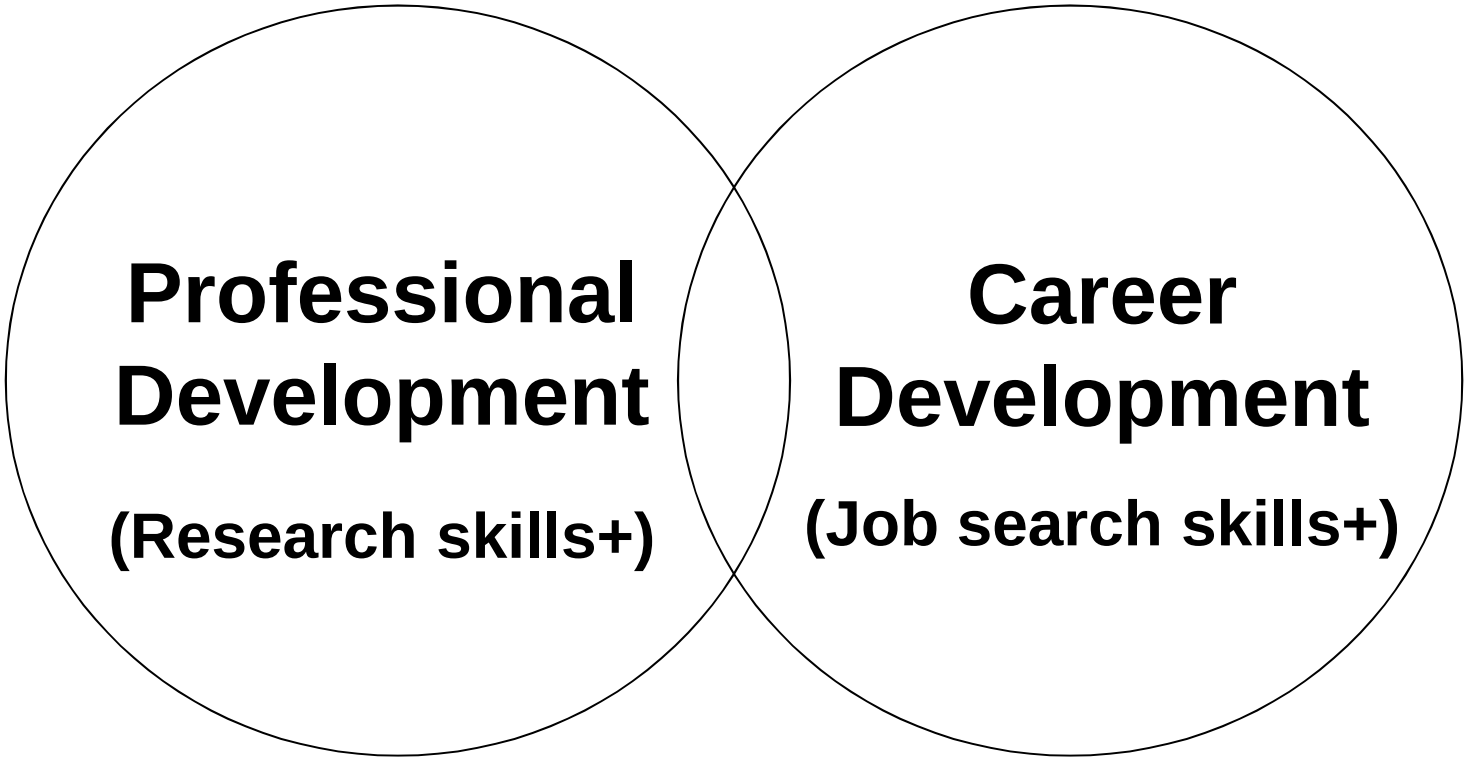
I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel. – Maya Angelou

A good mentor becomes superfluous. – Anon.

Mentoring Plans: Obstacles

- Successfully meshing different concepts of mentoring
- Postdocs' fear of spending time away from lab/research
- Devoting time to mentoring or being mentored
- Identifying worthwhile mentoring activities
- Budgets already tight

Mentoring Plans: Overview



Mentoring Plan: Overview

- **Effective mentoring recognizes the need for life-long learning.**
- **Effective mentoring recognizes that development occurs in stages.**
- **Effective mentoring is CUSTOMIZED for the individual.**
- **Effective mentoring is facilitated when the protégé is proactive.**

Mentoring Plan: Overview

1. Begin with self-assessment by postdoc
2. Develop/find/offer relevant activities
3. Schedule regular meetings
4. Final evaluation

Self-Assessment

- Identify strengths/challenges
- Discuss long-term options
- Select two or three short-term goals, keeping long-term plans in mind
- Mentor's role is to "keep it real"—and realistic

Self-Assessment

- **Individual Development Plan for Postdoctoral Fellows**
  - **Federation of American Societies for Experimental Biology (FASEB), Jennifer Hobin, Ph.D.**
  - **http://opa.faseb.org/pdf/idp.pdf**
- **Core Competencies Checklist**

Activities

- **For both Professional Development and Career Development**
  - **Opportunities within research group**
    - **Grant writing; networking**
  - **Opportunities at institution**
    - **Career counseling; managing students**
  - **Opportunities outside institution**
    - **Conferences; career fairs**

Meet, Listen, Advise

- Annual evaluations enough?
- One-on-one meetings
  - Not only about the work
- Group/team meetings
- Be accessible

Final Evaluation

- Self-assessment by postdoc
- Mentor evaluation by postdoc
- PI informal review or formal evaluation of postdoc's progress
- Ask postdoc to keep in touch!

Career Development

- Job search strategies
- Interviewing skills
- Writing CVs and cover letters
- Career counseling (vs. personal coaching)

Professional Development

Core Competencies

NPA committee began work in 2007

Core Competencies Committee

-Lida Anestidou, Ph.D., Program Officer, The National Academies Program
-Joan Chesney, M. D., Member, Department of Infectious Diseases, St. Jude Children's Research Hospital
-Emil Chuck, Ph.D., Faculty Member, Student Academic Affairs and Advising, Health Professions Advisor & Term Assistant Professor, George Mason University
-Phil Clifford, Ph.D., Professor of Anesthesiology and Physiology & Associate Dean for Postdoctoral Education, Medical College of Wisconsin
-Lisa Curtis, Ph.D., Instructor of Medicine, Department of Medicine, Division of Nephrology, University of Alabama at Birmingham
-Keith Micoli, Ph.D., Postdoctoral Program Manager, NYU School of Medicine, Sackler Institute of Graduate Biomedical Sciences
-Lucia Mokres, D.V.M., Program Specialist, Hantel Technologies
-Alyson Reed, M.B.A., Former Executive Director, NPA
-Nancy Schwartz, Ph.D., Professor, Department of Pediatrics, University of Chicago

Core Competencies: Background

- Roots in the Medical Education Community
- 1999 – Accreditation Council for Graduate Medical Education (ACGME) (GME = the medical training period equivalent to the post-PhD postdoctoral scholar training) creates six competencies

Core Competencies: Background

- Medical Knowledge
- Patient Care
- Interpersonal and Communication Skills
- Professionalism
- Practice-Based Learning and Improvement
- System-Based Practice

Core Competencies: Background

- **AAMC Compact Between Postdoctoral Appointees & Advisors/Mentors**
  - **Commitment of Postdocs to Be Proactive**
  - **Commitment of Mentors to Facilitate Professional Development**

Example: Competency Assessment

Professionalism

Lacks respect, compassion, integrity, honesty; disregards need for self-assessment; fails to acknowledge errors; does not consider needs of patients, families, colleagues; does not display responsible behavior

Always demonstrates respect, compassion, integrity, honesty; teaches/role models responsible behavior; total commitment to self-assessment; willingly acknowledges errors; always considers needs of patients, families, colleagues

1 2 3 4 5 6 7 8 9 N/A

Performance Needs Attention

Core Competencies: Background

- Core Tenets of Postdoctoral Training
  - Institutional Commitment
  - Quality Postdoctoral Training
  - Importance of Mentoring in Postdoctoral Training
  - Foster Breadth and Flexibility in Career Choices

Clinical Residents and Fellows	Parameter	Postdoctoral Scholars
Yes: AAMC, ACGME, Subspecialty Boards, ABMS, Professional Societies	Regulatory oversight of training by national accreditation organizations and professional societies	No
Yes: AAMC, LCME, JCAHO	Regulatory oversight of institutions providing training	No
Yes	Required regular assessments of trainees based on the Six Competencies for maintenance of training accreditation	No
Yes	Required trainee assessment of faculty on regular basis	No
Yes	Required training and certification of faculty providing training	No
Yes	Designated program director responsible for maintaining accreditation of training program	No

Core Competencies: Overview

- Life-long learning
- Competency-based learning assumes stages
  - Beginner
  - Novice
  - Competent
- At which stage should postdocs be?
  - Highly individualized
- Not intended to be prescriptive or limiting

Core Competencies: Overview

Purpose

Provide national guidelines for institutional development of curricula to address the needs of postdoctoral scholars for skill acquisition to achieve career success

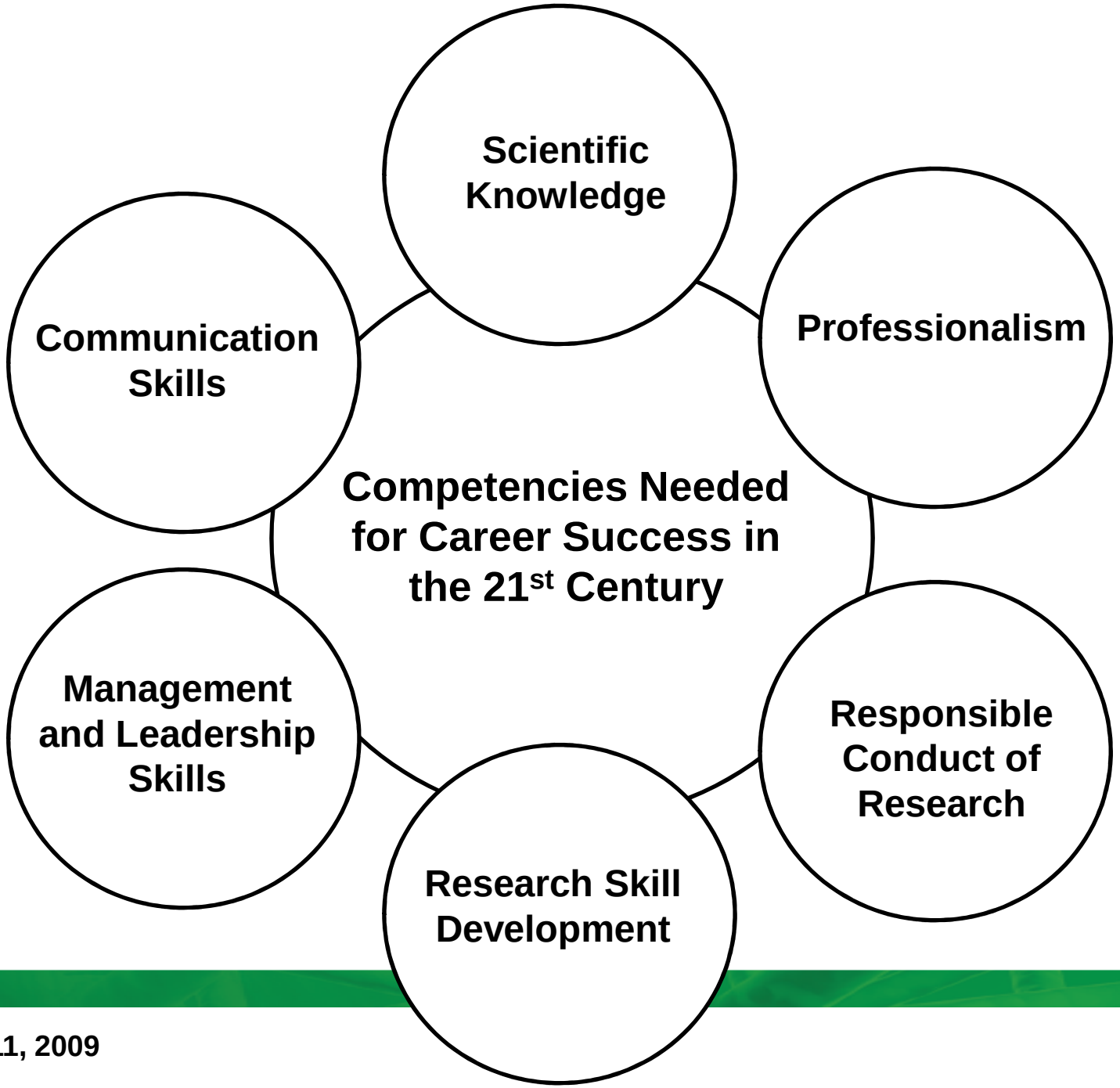
Core Competencies: Overview

Purpose

Provide guidelines for postdocs and mentors to assess success in completing the steps needed for scientific career fulfillment

Six Core Competencies

1. Discipline-Specific Conceptual Knowledge
2. Professional/Research Skill Development
3. Communication Skills
4. Professionalism
5. Leadership & Management Skills
6. Responsible Conduct of Research

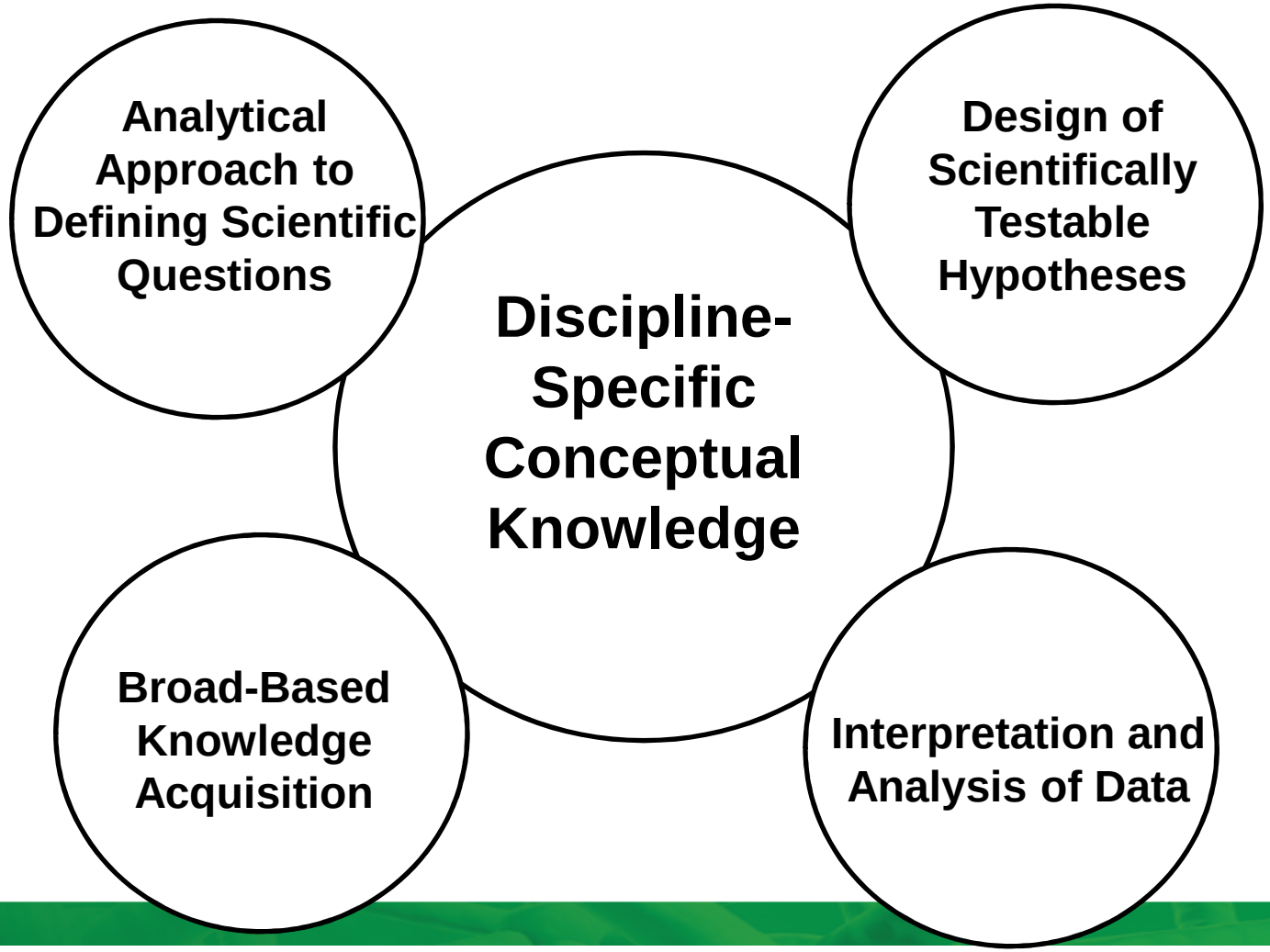

Scientific Knowledge
Professionalism
Responsible Conduct of Research
Research Skill Development
Management and Leadership Skills
Communication Skills
Competencies Needed for Career Success in the 21st Century

Concept

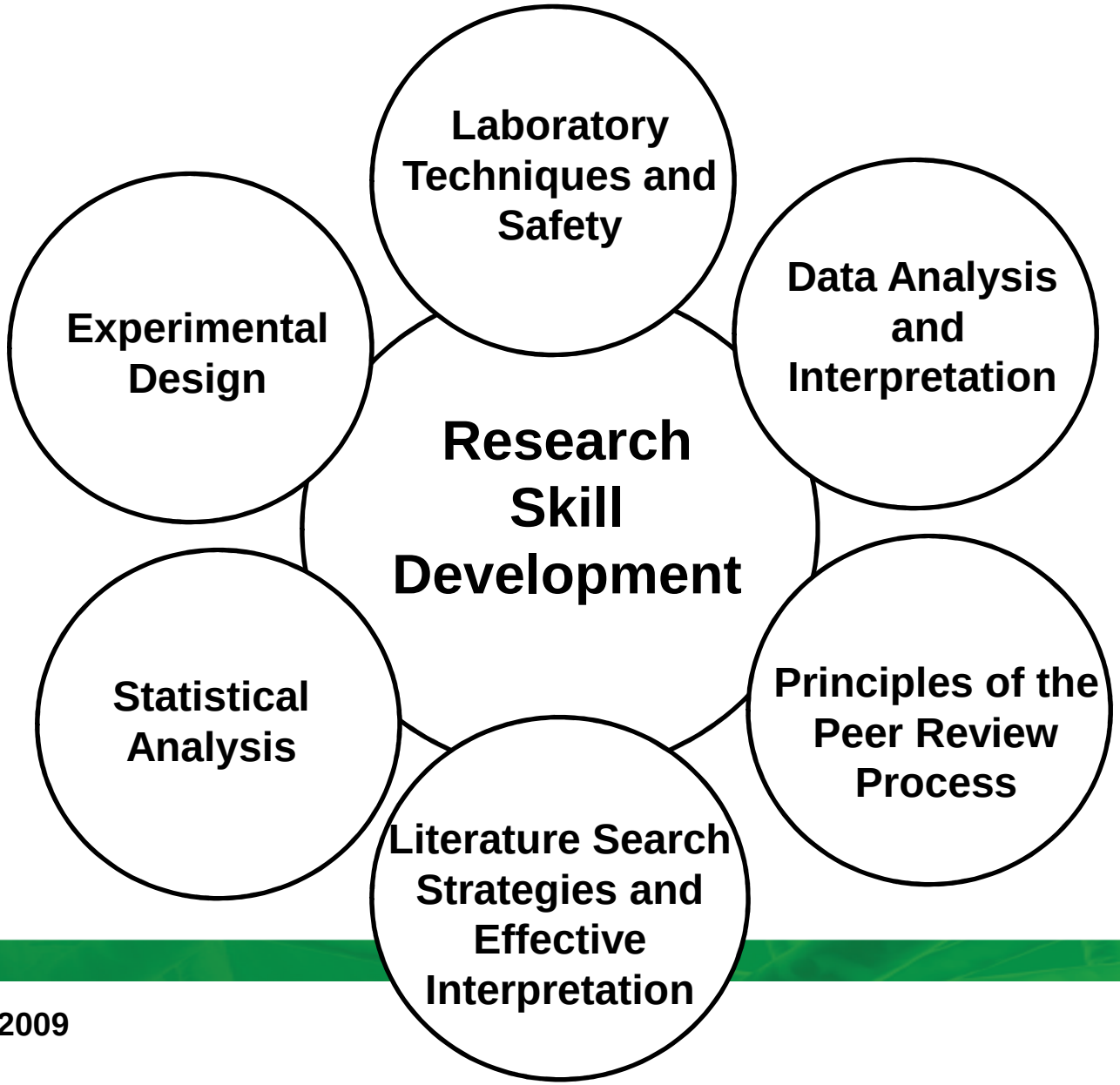
For each competency:

- **A: Rationale/Conceptual Foundations**
- **B: Components/Principles**
- **C: Delineation of Specific Skills**
- **D: Training Methods**
- **E: Specific Resources**

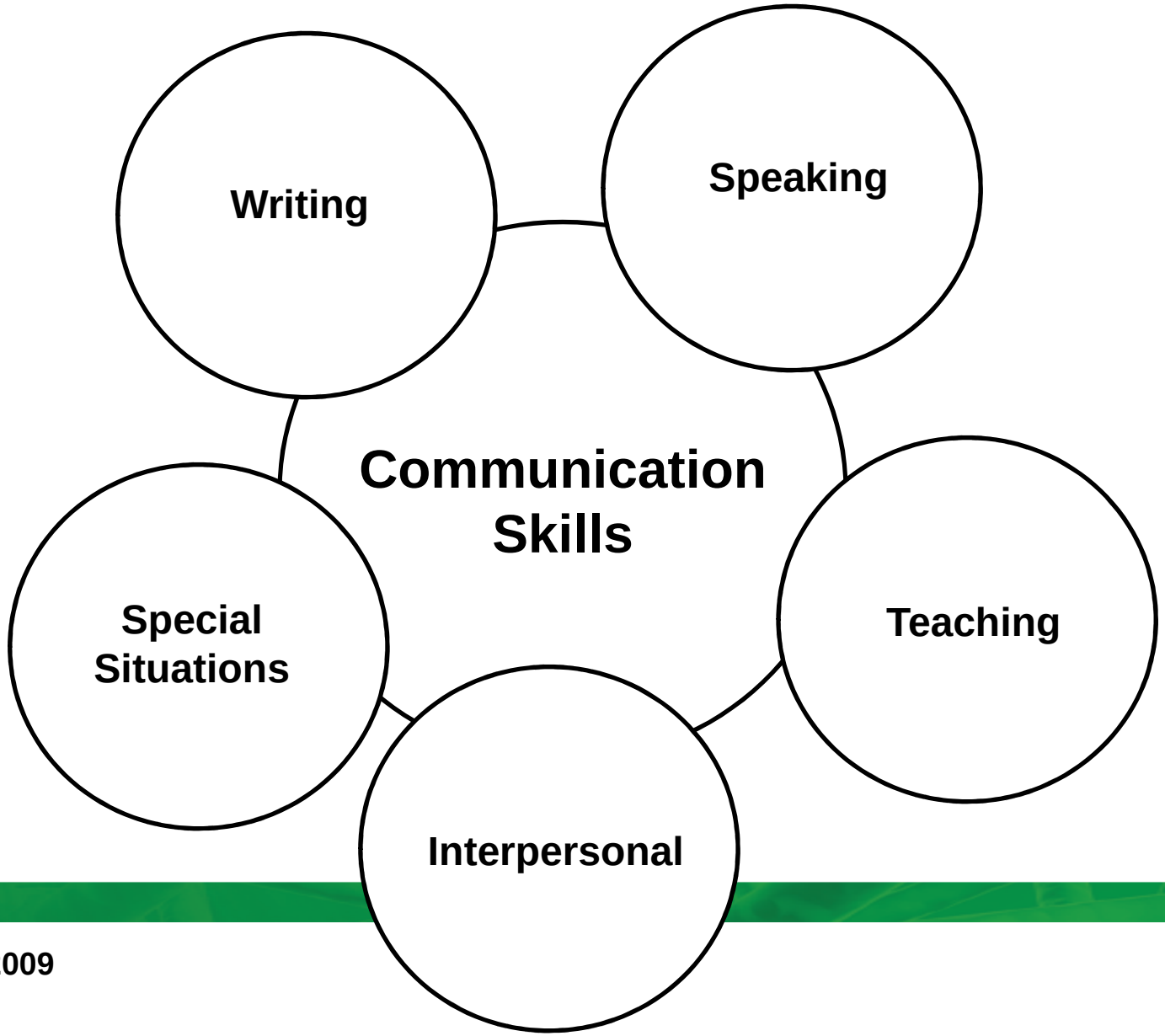
Core Competency #1



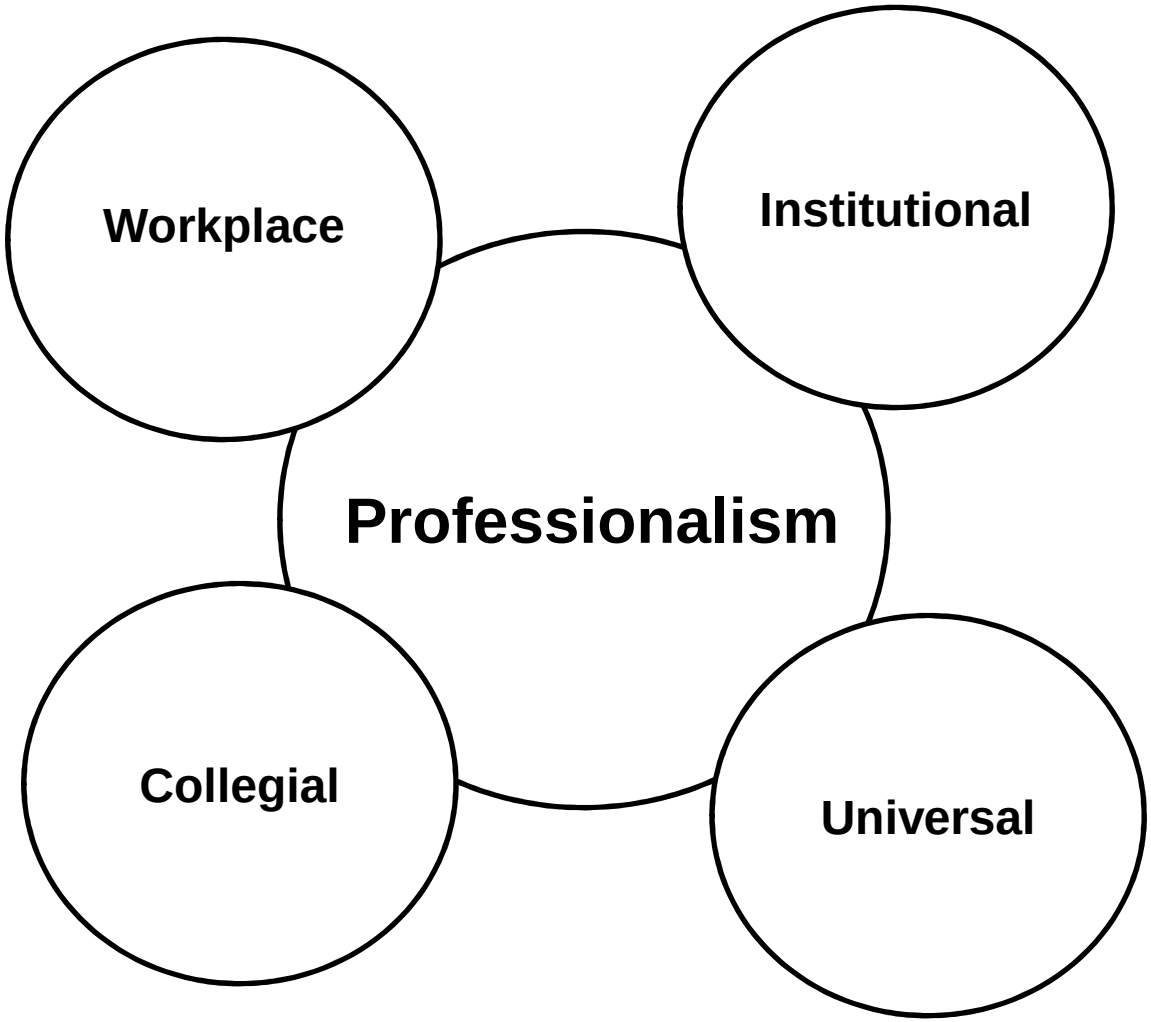
Core Competency #2



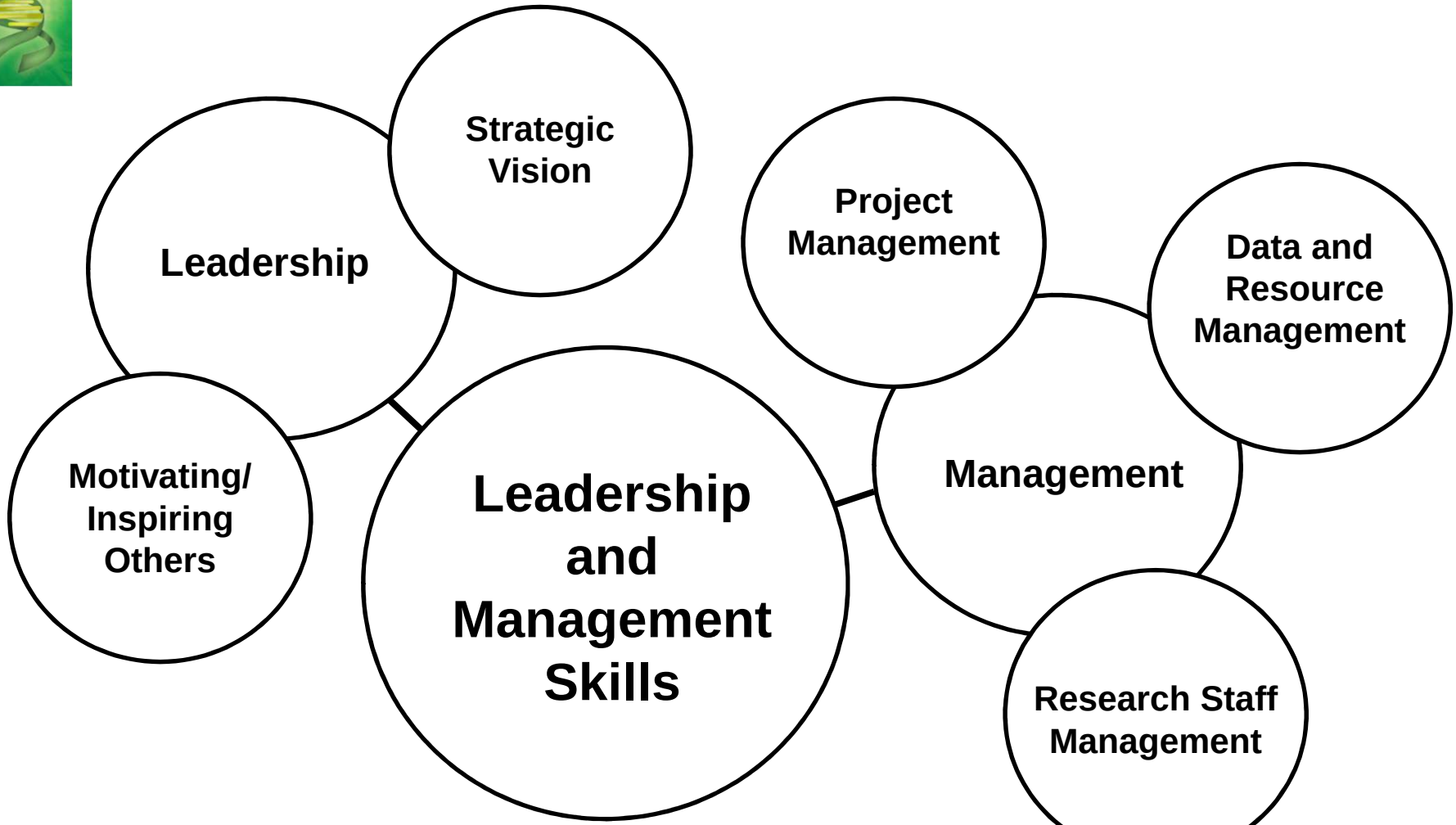
Core Competency #3



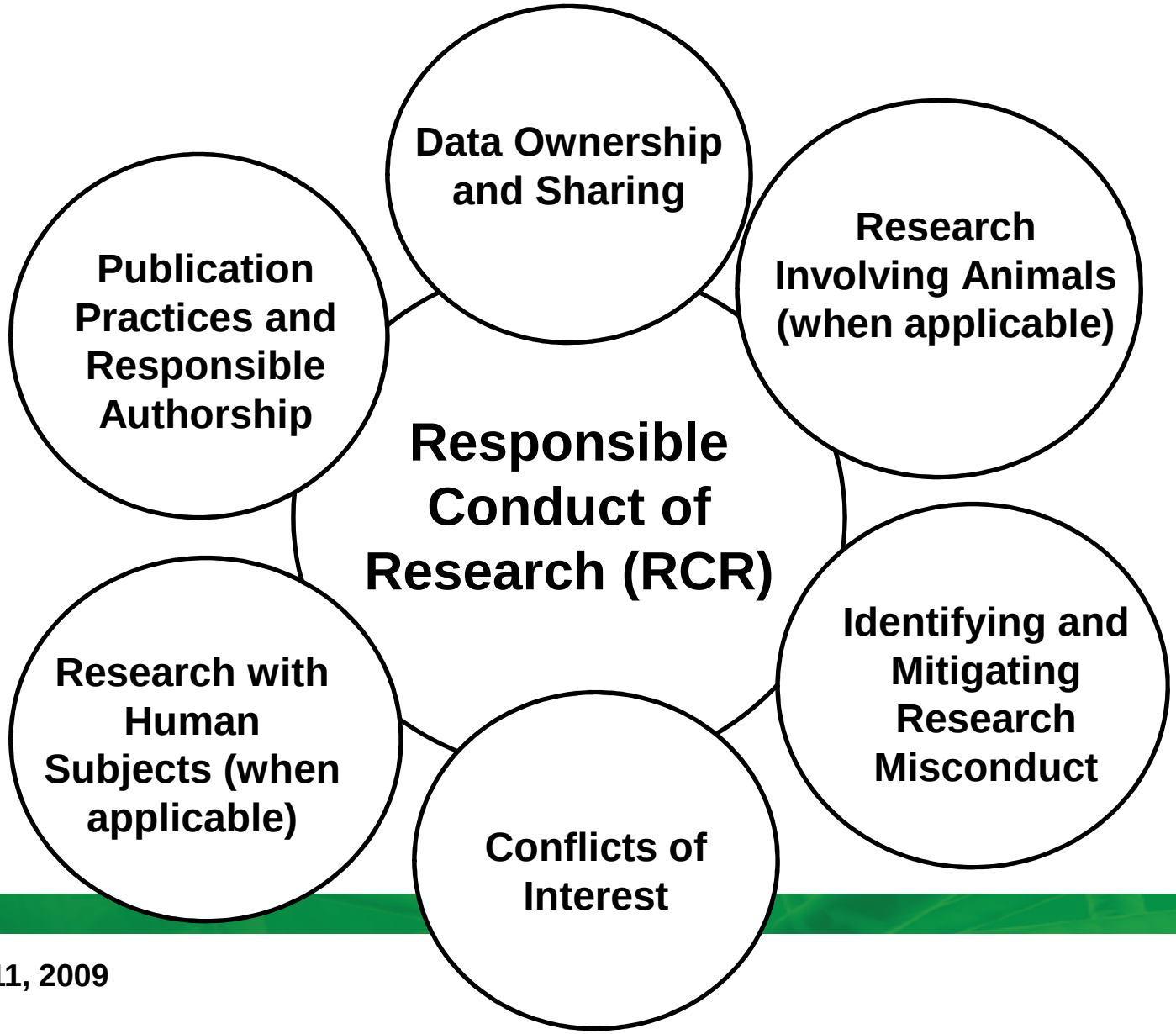
Core Competency #4



Core Competency #5



Core Competency #6



National Postdoctoral Association (NPA) Core Competencies Self-Assessment Checklist											
Rate your current level of development in each of the following, with 1 being "Needs attention" and 9 being "extremely competent." For more information on these competencies, please visit www.nationalpostdoc.org/competencies.											
		1	2	3	4	5	6	7	8	9	n/a
1	**Discipline-Specific Conceptual Knowledge**										
	Analytical Approach to Defining Scientific Questions										
	Design of Scientifically Testable Hypotheses										
	Broad-Based Knowledge Acquisition										
	Interpretation and Analysis of Data										
2	**Professional/Research Skill Development**										
	Literature Search Strategies and Effective Interpretation										
	Experimental Design										
	Statistical Analysis										
	Data Analysis and Interpretation										
	Laboratory Techniques and Safety										
	Principles of the Peer Review Process										
3	**Communication Skills**										
	Writing										
	Speaking										
	Teaching										
	Interpersonal										
	Special Situations										
4	**Professionalism**										
	Workplace										
	Institutional										
	Collegial										
	Universal										
5	**Leadership & Management Skills**										
	Leadership-Strategic Vision										
	Leadership-Motivating and Inspiring Others										
	Management-Project Management										
	Management-Data and Resource Management										
	Management-Research Staff Management										
6	**Responsible Conduct of Research**										
	Conflicts of Interest										
	Data Ownership and Sharing										
	Publication Practices and Responsible Authorship										
	Identifying and Mitigating Research Misconduct										
	Research with Human Subjects (when applicable)										
	Research Involving Animals (when applicable)										

Resources

NATIONAL POSTDOCTORAL ASSOCIATION

www.nationalpostdoc.org/mentoring