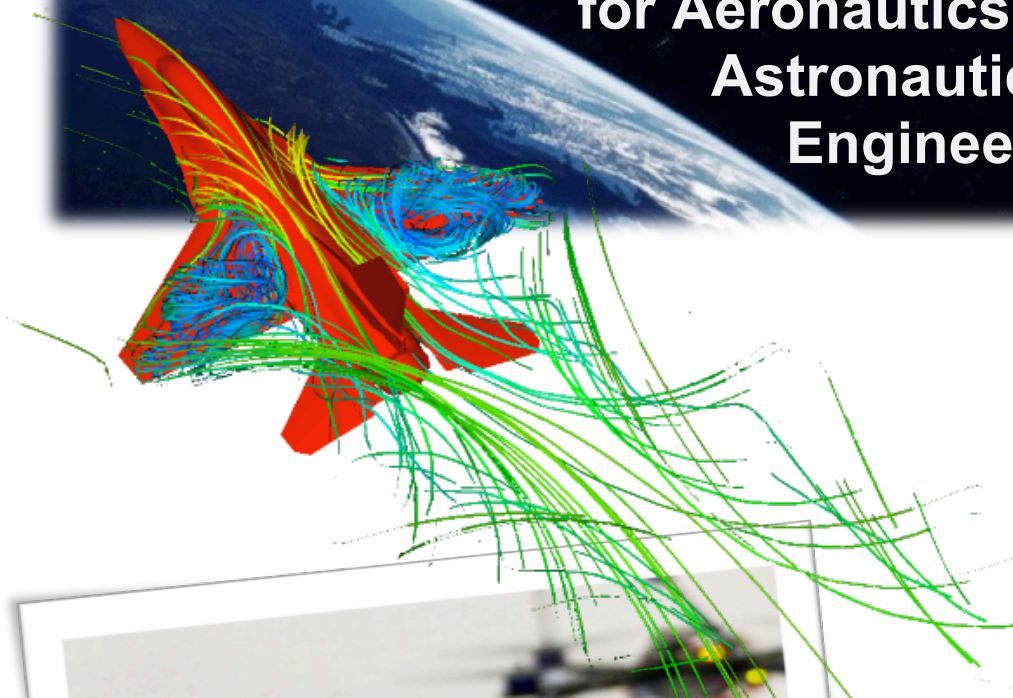


A Guide to Career Resources & Services



for Aeronautics &
Astronautics
Engineers



<http://studentaffairs.stanford.edu/cdc>

CDC GUIDE FOR AERO/ASTRO ENGINEERS

The Stanford University Career Development Center (CDC) is the principal career guidance and resource organization on campus. The aim of the CDC is to assist graduate and undergraduate students in their lifelong career development. This guide has been created specifically for aeronautical and astronautical engineering students with an emphasis on career planning and job searching. It is designed to help you (1) identify areas of technical interest, (2) effectively communicate your skills and academic achievement to employers, and (3) develop strong interview techniques that will help you to secure the job of your choice.

The American Institute of Aeronautics and Astronautics defines Aerospace Engineering as “the branch of engineering focused on the design, construction, and testing of aircraft and spacecraft.” It is broadly categorized into two major overlapping disciplines: (1) Aeronautical engineering, which deals with vehicles within the Earth’s atmosphere, and (2) Astronautical engineering, which deals with vehicles outside of the Earth’s atmosphere.

Growth in aerospace engineering employment has been increasing slowly, but steadily, over the last decade. The number of jobs in the US is forecast to increase by about 5% from 81,000 in 2010 to 85,000 in 2020, according to the U.S. Bureau of Labor Statistics. The employers of these engineers range from private industry to government to academia.

The function of these engineers includes research, product design and development, manufacturing engineering, test engineering, quality control, and program/project management, among others. In industry, all of the above functions are employed. For government, research and program management are typical functions of aerospace engineers. In academia, research and teaching are the main functions. Aerospace engineers are often categorized as highly skilled professionals with expertise applicable in the broader areas of mechanical, electrical, and software engineering.

Apart from the government agencies that have traditionally been the drivers of growth in aerospace, a new suite of private companies has been quickly emerging to offer varied opportunities. Aeronautical research and development areas of particular interest to industry include improving the

safety, comfort, efficiency, and environmental soundness of aircraft. Modeling and simulations with Computational Fluid Dynamics (CFD) and Computational Structural Dynamics (CSD) are also of great interest. In aeronautical engineering, developing new rocket technologies, human and robotic space exploration, and modeling are areas of good opportunities.

Some aerospace engineering projects are linked to national defense and therefore require security clearances. They may not be able to employ foreign nationals.

The following section explores the many employment opportunities for aeronautical and astronautical engineering students and graduates. In order to access all CDC resources as a Stanford student, you should register via the CDC website: <http://studentaffairs.stanford.edu/cdc/jobs-internships>

Best of luck in your job search!

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CAREER OPPORTUNITIES

Aerospace students at the undergraduate and master's level who wish to work in the industry after graduation are encouraged to engage in research and design projects during their university education. This may be through project-oriented classes, summer research opportunities, or even practical work experience through internships. The value of project-based experience as a student cannot be overestimated in the eyes of an employer, especially since entry into this industry is highly competitive.

University research projects and corporate internships offer aerospace engineering students valuable insight into the life of a professional aerospace engineer. Jobs have traditionally been highly responsive to defense industry spending and anticipated aerospace activity.

Aerospace engineers commonly specialize in the following areas:

Aerodynamics

Aerodynamics engineers design and test the external surfaces of atmospheric aerospace vehicles. They often use computational methods to simulate fluid flow over aircraft, perform wind tunnel and other experiments, and determine the aircraft performance characteristics based on the external aerodynamic features and performance. Aerodynamics research is often carried out jointly between universities and industry, leading to opportunities in both.

Propulsion

Propulsion engineers develop and improve propulsion systems for aircraft and spacecraft. This includes conventional chemical engines used in rockets and turbofan or turbojet engines used in aircraft. There is research and development in new kinds of propulsion, such as hybrid rockets, plasma propulsion for interplanetary space travel, and lightweight micro thruster technologies in small satellites.

Guidance, Navigation, and Control (GNC)

Engineers in this specialty develop instruments and software to control the safe movement of vehicles, such as aircraft and spacecraft, and precision trajectory analysis of missiles and satellites.

Structures and Materials

Structures and materials engineers are responsible for creating a strong, light, and durable airframe that can house the avionics, flight-deck systems, passenger provisions, and more. Structures and materials engineers deal with the analysis and design of structures that support or resist loads in flight as well as on the ground. A particularly important focus in recent years is manufacturing newer, tougher, and lighter materials, such as carbon fibers.

Systems Integration

Systems engineers play an important role in developing new tools and processes to manage the increasingly complex systems being built. It is important for systems engineers to stay trained in the latest technological applications for the most effective integration of the teams and projects from different backgrounds in this interdisciplinary field.

Computational Aerospace Engineering

Computational Aerospace Engineering is a relatively new discipline that deals with the development and application of computational models and simulations. It is often coupled with high-performance computing to solve complex physical problems arising in aerospace engineering analysis and design. Typical applications include computational fluid dynamics, computational thermodynamics, computational combustion, computational solid mechanics, computational structural dynamics, multidisciplinary design optimization, and trajectory calculation of satellites. In many aerospace applications, computer simulation is essential to business and research, as it provides an alternative to experimentation when the latter is prohibitively expensive or simply not possible.

CAREER COUNSELING

The CDC a team of engineering counselors to help declared Aero/Astro students in the following areas:

- Clarifying interests, skills, values, and work style
- Exploring career options
- Outlining a job-search plan
- Developing strategies for obtaining a job
- Reviewing the résumé and cover letters
- Practicing for job interviews
- Negotiating job offers

CDC Appointments

The CDC offers face-to-face, phone, or Skype appointments with its counselors.

For an individual appointment, log into your Cardinal Careers account, and click on the link “Request an Appointment.”

15-Minute Appointments: for quick answers and to review résumés and cover letters.

45-Minute Appointments: for discussing multiple questions or to work on any of the topics listed above.

INFORMATION GATHERING

In support of your career planning and job search, there are many sources of employment information to help you make decisions and find employers. These sources are presented below:

The Career Development Center Library

The Career Center Resource Library, located on the second floor of the CDC building, supports the Stanford Aero/Astro Department with a wide array of information on organizations through which graduates and students can find employment. The library contains a highly selective collection of books, magazines, e-books, guides, and videos, all to assist you in learning about the world of work.

The CDC library possesses many books and other materials that relate to career planning and job searching in engineering fields. Feel free to contact the resident librarian to help you navigate through this vast amount of career and employment information.

Networking

Networking involves contacting people who may provide you with valuable information about organizations and job opportunities in your field of interest. They may be friends or classmates already working in your field, professors, or even friends of your parents. Networking is the search for information to use in your pursuit of a career. At this stage of your employment quest, networking is not asking for a job.

The CDC offers a Guide for Informational Interviews that is comprehensive and worthy of your study. To see this guide, access:

<http://studentaffairs.stanford.edu/cdc/networking/informational-int>

The CDC also oversees the Stanford Alumni Mentoring Program (SAM) in which alumni volunteer to provide Stanford students with career guidance and advice about life after Stanford. Access this site:

<http://mentoring.stanford.edu>

Internet Sources

The commercial website LinkedIn offers thousands of professional profiles and the ability to link up with people for career advice and employment opportunities. Go to www.linkedin.com

Student and Professional Societies

There are many Stanford student societies that offer networking opportunities for members. Search the Stanford websites for engineering or other organizations that interest you:

<http://engineering.stanford.edu/portals/student/student-organizations>

Professional societies or associations can be powerful allies in the search for employer information. There are societies for all industries and technologies and many accept student memberships. For an excellent site listing all engineering societies, go to: career-advice.monster.com/job-search. The most relevant society for Aero/Astro students is:

American Institute for Aeronautics and Astronautics: <http://www.aiaa.org>

Stanford Engineering Affiliate/Partnership Programs

The School of Engineering sponsors dozens of programs in which industrial organizations partner with departments, labs, or specific programs to conduct research of benefit to both. By joining these teams, Aero/Astro engineers may benefit from exposure to industry engineers and scientists.

To view all of these programs go to:

<http://engineering.stanford.edu/partnerships/affiliate-programs>.

If interested, contact the professor in charge for participation qualifications. An obvious one to explore is:

Aeronautics and Astronautics Industrial Affiliates Program

PREPARING TO CONTACT EMPLOYERS

The importance of preparing yourself to contact or meet with prospective employers cannot be overestimated. In addition to researching employment opportunities and organizational information, you should create a résumé and other documents that describe yourself in terms that are of interest to an employer. When an interview is scheduled, it's important to organize your thoughts and practice your interviewing skills.

The CDC Career Planning Handbook

The CDC Career Planning Handbook is a publication revised annually. It is a comprehensive booklet containing a wealth of information on the entire job seeking process. It contains job search strategies, examples of résumés and cover letters, interview etiquette and dress, job offer negotiations, and much more.

This handbook is extremely useful for all Stanford Aero/Astro students. Copies are available free on the second and third floors of the CDC and in PDF format on the CDC website at:

<http://studentaffairs.stanford.edu/cdc/services/handbook>

Creating a Résumé

Your résumé is one of the most important documents that you will use in your job search. An effective résumé opens the door of opportunity for you and acts as a roadmap for interviewers during the selection process. It also acts as your spokesperson long after the interview is over. The creation of a proper résumé is not a topic that can be addressed in the few short pages of this guide. However, you can find comprehensive advice, with many samples, in the following references as well as from a CDC career counselor.

Book: *Knock 'em Dead Resumes* – Eighth Edition, Martin Yate

Book: *The CDC Career Planning Handbook*

Website: <http://studentaffairs.stanford.edu/cdc/resumes>

Creating a Cover Letter

The purpose of writing a cover letter for your résumé is to interpret the facts on the résumé and highlight your skills and experience for the prospective employer. It is also an example of your writing skills. It is often the first contact with an employer, so it is important to make a good impression. For help in writing an effective cover letter, see the following guides and aids:

Book: *Knock 'em Dead Cover Letters* – Eighth Edition, Martin Yate

Book: *The CDC Career Planning Handbook*

Website: <http://studentaffairs.stanford.edu/cdc/resumes/cover-ltr>

The Interview

The interview is one of the most important elements of your job search. It is your opportunity to persuade an employer that you are the right person for the job. One of the critical things you should do before the interview is to research the company's services, structure, values, and mission statement. This allows you to find common ground and become invested in the interviewer's work. Types of interviews include telephone, Skype, in-person, dining, screening, and group. There are many resources available to aid you in the preparation for an interview. Some are:

Book: *Knock 'em Dead 2010* – Martin Yate

Book: *The CDC Career Planning Handbook*

Website: <http://studentaffairs.stanford.edu/cdc/interviewing>

Meet Ups

The CDC engineering team offers a variety of useful events throughout the academic year. Log-in to your Cardinal Careers account to check the CDC Calendar of Events for scheduling details:

<http://studentaffairs.stanford.edu/cdc/jobs-internships>

Then click on the link: MeetUps/Events.

CONTACTING EMPLOYERS

There are many avenues available for Aero/Astro majors to meet prospective employers, on campus and off. The purpose of all of your preparation is to meet with an employer for an interview. Below are resources, events, and strategies that are designed to offer you meetings with employers in person, by phone, or via the Internet.

Career Fairs

There are several career fairs held on campus throughout the year that attract employers interested in hiring Stanford Aero/Astro majors. These fairs offer unique opportunities to meet representatives of recruiting organizations, learn about their industry, and give them a positive first impression. They showcase hundreds of companies, offering internships and full-time positions, year-round.

To view the entire CDC career fair schedule access:

<http://studentaffairs/stanford.edu/CDC/services/career-fairs>

Those of particular interest to Aero/Astro majors include the following:

Fall Career Fair

Sponsored by the CDC, this fair is held in early October in White Plaza. It typically hosts over 250 organizations, about half of which are recruiting engineering majors. This fair is held in the early stages of most organizations' yearly recruiting programs. Full-time jobs and internships are available.

Engineering Opportunity Job Fair

Sponsored by the School of Engineering and the CDC, this fair is held in late January at the Huang Engineering Building. About 140 organizations attend each year, all interested in science and engineering majors. Full-time jobs and internships are available.

Spring Career Fair

Sponsored by the CDC, this career fair is held in April in Tresidder Union. Over 100 companies typically attend.

Cardinal Recruiting

Cardinal Recruiting is an on-campus, face-to-face interviewing program offered by the CDC. Recruiting organizations come to the campus and interview students who sign up ahead of time for a time slot. The interviews are held for four weeks in the fall and four weeks in the winter at the CDC.

For more information, go to:

<http://studentaffairs.stanford.edu/cdc/services/cardinal-overview>

Cardinal Careers & iNet Internships

Cardinal Careers is the official job posting website exclusively meant for Stanford students. Log on to Cardinal Careers at <http://studentaffairs.stanford.edu/cdc/jobs-internships>. This site lists over 1,000 jobs at any time. Browse jobs by keyword, location, industry, etc., and upload your résumé or CV.

From the same website, you can also log in to iNet Internships, a consortium between Stanford and ten U.S. universities, with over 500 summer, part-time, and internship positions. The interface is identical, but focuses on internships with a definite time range.

Stanford Résumé Service

The CDC maintains an exclusive database of résumés submitted by students each year that employers pay to access. The database is open from September 1 to August 31. Submit your résumé by uploading it from your Cardinal Careers account. Employers may contact you regarding more information about a job.

Direct Outreach to Organizations

In addition to using the resources discussed so far, direct contact with relevant employers could be another important job search strategy.

A sample letter for direct contact can be found in the *CDC Career Planning Handbook* mentioned earlier in this guide.

The following Appendix lists representative organizations that employ Aero/Astro engineers. The list includes foreign as well as U.S. employers. The list also indicates what aerospace products each organization designs and/or manufactures.

APPENDIX: LIST OF ORGANIZATIONS

- Fixed wing
- Rotary wing
- ▲ Spacecraft

		Aerodynamics	Avionics	Propulsion	Robotics	GNC	Structures and Materials	Simulations / Software	Space Systems
Industry									
Ad Astra	▲			✓					
Aerojet	▲			✓					
Aerospace Corporation	▲			✓					✓
Aerovironment	●	✓		✓				✓	
Andrews Space	▲								✓
Astrobotic	▲				✓				✓
Bell Helicopter	■	✓							
Bigelow Aerospace	▲								✓
Blue Origin	▲			✓					
Boeing	●■▲	✓	✓	✓	✓		✓	✓	✓
Cessna	●	✓							
Desktop Aeronautics/Aerion	●	✓						✓	
General Dynamics	●	✓	✓		✓	✓	✓		
GE Aviation	●			✓					
Honeybee Robotics	▲				✓				
Honeywell	●■▲		✓			✓		✓	
Lockheed Martin	●■▲	✓	✓	✓		✓	✓	✓	✓
Made in Space	▲						✓		
Northrop Grumman	●■▲	✓	✓	✓		✓	✓		
Orbital Sciences	▲			✓					✓
Pratt & Whitney	●			✓					
Pumpkin Inc.	▲								✓
Raytheon	●■▲	✓	✓	✓		✓			

- Fixed wing
- Rotary wing
- ▲ Spacecraft

		Aerodynamics	Avionics	Propulsion	Robotics	GNC	Structures and Materials	Simulations / Software	Space Systems
Sierra Nevada Corporation	▲					✓			✓
Skybox Imaging	▲							✓	✓
SpaceX	▲		✓	✓		✓		✓	✓
Space Systems/Loral	▲		✓			✓		✓	✓
Textron	●■	✓	✓						
United Technologies	●■	✓		✓					
Virgin Galactic	●▲	✓		✓					✓
Government									
NASA	●■▲	✓	✓	✓	✓	✓	✓	✓	✓
Department of Defense	●■▲	✓	✓	✓	✓	✓	✓	✓	✓
National Labs (Sandia, LANL, etc.)	●■▲	✓	✓	✓	✓	✓	✓	✓	✓
International									
BAE Systems	●■▲	✓	✓	✓	✓	✓	✓	✓	
Bombardier Aerospace	●	✓	✓						
CAE	●							✓	
CNSA	▲			✓		✓	✓	✓	✓
DLR	●▲	✓	✓	✓	✓	✓	✓	✓	✓
EADS	●■▲	✓	✓	✓	✓	✓	✓	✓	✓
Embraer	●	✓	✓						
GMV	●	✓	✓			✓		✓	✓
ISRO	▲			✓		✓	✓	✓	✓
JAXA	▲	✓	✓	✓	✓	✓	✓	✓	✓
Academia	●■▲	✓	✓	✓	✓	✓	✓	✓	✓

**Please note this is a partial list.*

**Career Development Center
Stanford University**

Student Services Building
563 Salvatierra Walk
Stanford, CA 94305

General Information	650-723-3963
Counseling Services	650-725-1789
Career Resource Library	650-723-1545
Employment Services	650-723-9014
CDC Fax	650-723-0365

Hours

Counseling Services:

Monday – Friday
8:15 a.m. – 5:00 p.m.

Employment Services:

Monday – Friday
8:15 a.m. – 4:30 p.m.

Visit our home page:

<http://studentaffairs.stanford.edu/cdc>

