

PREPARING FOR THE HUMAN FACTORS/ERGONOMICS JOB MARKET

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ABSTRACT

The panel is designed to help an individual decide on a specialization in human factors/ergonomics and to prepare to enter the human factors job market. Panelists were selected to represent a cross-section of the field, and are from the following sectors: the electronics industry (Megan Brown), loss prevention research (Max Fogleman), academia (Joe Goldberg), the computer industry (Dick Granda), the government (Joe Hale), and consulting (Liz Sanders).

INTRODUCTION

Panelists described their working environment by addressing each of the following questions:

- What are typical job responsibilities?
- How many projects are you involved with simultaneously and how long do projects last?
- How do you apply scientific/technical training in your work?
- What other types of people do you work with?

Responses to these questions are presented in this paper.

Panelists also addressed the attributes that employers are seeking in human factors/ergonomics professionals, and how to seek a job in the field. These responses are contained in the appendices of this extended version.

JOB RESPONSIBILITIES

Electronics Industry

You would generally work as a member of a team designing a product. These teams have a Project Manager and consist of 4 or 5 people. Concepts are designed and tested by the team, beginning with emotional and behavioral research. There is constant consumer contact.

Consumers are brought in one at a time for tests, for a focus group or participatory research. This is highly iterative process. You would be responsible for coordinating the research, analyzing the data, and if necessary, changing the design of the product.

Loss Prevention Research

Job responsibilities include writing proposals for projects, including background literature reviews, investigation of business relevance, and experimental design. Once projects are approved by an internal process, you are responsible for the recruitment of subjects, laboratory preparation, data collection, data management, and data analysis. The amount of this that you actually do on your own depends on the size of the project and the project team. Project results are expected to be published in peer reviewed journals. The atmosphere can be characterized as quasi-academic. You work almost exclusively as a member of a project team (rarely alone), either as the principle investigator if you originated the idea or as a co-investigator if you are invited to join a project by another researcher.

Academia

Jobs in an academic environment may or may not include teaching, advising, and service

responsibilities (e.g., a research associate in a campus research center or institute). However, the comments below consider a typical tenure-track assistant professor who will be teaching. A tenure-track appointment in academia typically consists of the responsibilities in teaching, research/scholarship, and service.

Teaching includes both undergraduate and graduate courses, and direct supervision/advising of graduate and undergraduate students. Teaching courses includes: preparation of lectures, student contact (lectures and office hours), laboratory development, supervision of TAs, examination administration, and communication with other colleagues.

Research/scholarship includes generation of proposals for funding, research, and papers. There may be a nominal expectation of number of refereed journal articles and conference proceedings papers per year. Scholarship may also consider how current you are in your field, as evidenced by type of funding, nature of work, society leadership, etc. You are generally encouraged to remain active in your field via conference presentations, local or national offices in societies, or other efforts.

Service includes a multitude of committee or other work to serve your department, college, university, community, industry, societies, or government. Reviewing includes: (1) proposals for agencies (e.g., NSF, state agencies), (2) journals (e.g., Human Factors), and (3) trade or other publications. Service work can be very diverse; for example, student society advising, promotion/tenure committees, faculty recruiting, student recruiting, fellowship and awards, etc.

Generally, teaching and research/scholarship are more treasured at review time than service work, although some amount of service is required. Job responsibilities tend to change over time, as one moves from assistant to associate to full professor. Generally, you serve more on college and university-level committees over time, and you may supervise more RAs. Some department heads try to keep young faculty active in research, and may lessen the service, teaching and advising requirements in early years.

Computer Industry

Your most important responsibilities are to be responsive, reasonable, dependable and

economic in carrying out your assignment(s). Remember, you will be working for a profit making organization - they will demand that you have a business as well as technical competence. Your technical job responsibilities most likely will include a variety of design building and/or development assessment activities such as building prototypes, analytical evaluations, usability testing, customer evaluations, competitive analyses. Typically, new hires do not have immediate supervisory responsibility. In some companies, however, they do have supervision of a few technicians.

Government

Depending upon the project and/or phase of a project, your responsibilities may include analysis, design, and/or test and evaluation. Analysis would include functional and task analyses, anthropometric analyses, and requirements and standards development. Design includes concept and preliminary design development and operations development. Your involvement in detailed design is primarily through technical interchange with the designers and during design reviews. Test and evaluation include simulation as well as empirical studies.

Simulation includes computer simulation (e.g., flight simulators, Virtual Reality) and "micro-gravity" simulation in the Neutral Buoyancy Simulator (a large "swimming pool") or the KC-135 (an aircraft that flies parabolas to produce short periods of micro-gravity).

Most of the work is unstructured. Although initially disconcerting, this does give you the freedom to structure your own time to accomplish your assignments and, for self-starters, it provides ample opportunities to seek out and pursue special technical interests. The latter is encouraged and can often be supported by "in-house" funding. Much of the work is sedentary although you are occasionally involved in building and assessing mock-ups. Travel is intermittent and usually to other NASA centers and contractor sites within the US. Travel to international locations is infrequent. Working for NASA is challenging and rewarding. Its charter is grand and inspiring, its work force is well educated and motivated, and its technologies and capabilities are broad and often state-of-the-art.

Consulting

We provide service in business consulting through design. We identify business opportunities and solve business problems through product and user interface design, communication design, as well as through retail and environmental design. We work in many different industries including consumer electronics, entertainment, communications, medical devices and equipment, toys and educational products, computer and office products, military equipment, etc.

We approach everything that we do from an interdisciplinary perspective and rely quite heavily on the power of team work.

As a member of a project team, the role of the HF practitioner is to do whatever needs to be done (within tight time and budget constraints) to ensure that the needs of the user(s) are discovered, are understood and are ultimately met by the product, interface, communication or environment that is under development. We have frequent, direct, and iterative interaction with the potential users. We also see to it that other team member (e.g., engineers, designers, writers, etc.) have direct interaction with the users, as well.

The HF practitioners at my company have spent a lot of time and effort recently exploring tools and methods of generative research. We have many evaluative techniques available to us, but we have found that HF can have greater impact on the design development process if we can get users to reveal to us their tacit, unmet needs very early in the development process, before design concepts and prototypes are even available.

The HF practitioners also play a large role in business development. We have a large team of dedicated people whose job it is to find new clients and to develop new projects with current clients. They are not, however, conversant in HF or in user research, so a portion of our time is spent meeting and talking with potential clients, writing proposals, etc.

Another aspect of the HF practitioner's role is that of public relations. This activity includes speaking at conferences and writing articles.

PROJECT INVOLVEMENT

Electronics Industry

You could be involved in as many as five projects simultaneously. You would never work on a project by yourself. The projects last anywhere from 6 months to 1.5 years.

Loss Prevention Research

The guideline is that each researcher be involved in no more than six projects at any given time and be principle investigator on no more than three of those projects. This is only a guideline and does not include consulting on projects, writing papers for conferences, outside speaking engagements, etc.

The length of a project varies from several weeks to several years. It is expected that there be a significant milestone for each project at least on an annual basis. This milestone is preferably in the form of a published article.

Academia

In an academic setting, you will be involved with as many projects as you can handle--you will be the one who makes this decision. Some faculty only like to work on one large project at a time, while others strive for many projects of varying size. You will generally be more highly rewarded and advance more quickly with more and larger projects.

Most projects will last at least an academic semester, or the time period over which a graduate student is hired. One year projects are common, but multi-year funding is very competitive. Companies and agencies may contract for a year, with the potential to renew from year-to-year on a review of progress basis.

Computer Industry

This depends upon the environment you are working in. In some organizations there may be a central Human Factors group. There may be as many as ten or more HF people that service all of the company's products. Such a group is also likely to be inter-disciplinary with industrial/graphical designers, information developers, and engineers. In this situation, the HF professional services many products for their entire life cycle. In other companies, the Human Factors professional is hired by a single product development group. Thus, the person may have

only a single product. However, in this case, it is likely that the HF professional will be involved in multiple aspects of the product as it goes through the design/development cycle. When work on that product is complete (in, perhaps, a year) the person might move onto another product development group.

Government

Because of a matrix organizational structure, you may be working several different projects simultaneously. Project durations vary, but usually last several years. Spacelab payload analytical integration may begin several years before launch. Design and development for the Space Station has been ongoing for several years and it will be several years before it is completed. At that time we will begin up to 15 years of operations and utilization.

Consulting

You might be actively involved with anywhere from two to six projects simultaneously. The average length of a project is two to three months, although many extend over longer time periods. In addition to active projects, you might also be involved in the selling of two to six projects. This would involve meeting the potential client, writing a proposal or contributing to a proposal someone else has written.

For example, at the time I am writing these responses I am actively involved in the following types of projects: learning tools for fourth through eighth graders, creative activities products for preschoolers, furniture for hotel rooms, and a store for pet owners. In addition, I am involved in selling human factors and/or user research on the following types of projects: large-scale equipment for the newspaper industry, plastic food storage bags, a 100-acre sports complex, an interface for a notebook computer, and nuclear imaging systems.

APPLICATION OF TRAINING

Electronics Industry

Many of the skills that I use in my job I picked up from my previous work experience. My scientific/technical training from school is used for the initial consumer research, designing

usability tests, analyzing data, writing reports, and presenting the results.

Loss Prevention Research

I use all formal technical training on a daily basis; this includes training in ergonomics, statistics and experimental design, computer programming (for data manipulation and analysis), and some knowledge of laboratory hardware. However, the value of written and oral communication and the ability to work cohesively with other people is especially important. Generally, breadth of knowledge as well as a specialization is an asset in the environment in which I work.

Academia

In academia, your scientific and technical training is applied everyday, through both teaching and research. Teaching at the graduate level will keep you on your toes and current within a research field, as you prepare for each class lecture. Your training will also be used in writing proposals, conducting research, and in the laboratory. In our field, expertise with hardware and software is highly desirable, especially if laboratory technicians are not always reachable.

Computer Industry

You are being hired because you know how to think, organize, on a system level from a scientific/empirical standpoint. After all, you will be responsible for influencing a major component of the system - namely, the human-computer interface. It is your job to figure out how to apply your knowledge of humans, of product design, and of product evaluation to the company's product line.

Government

Technical training develops the analytical skills (how you approach a problem) and provides the analytical tools (e.g., functional and task analyses, anthropometric analyses, etc.) used in the requirements development and in early design analysis. Later in the design process, during test and evaluation, and in applied research, skills developed through scientific training (e.g., experimental design, statistical analysis, etc.) come to bear. Though not specifically addressed in the question,

management training and skills can prove very useful. This certainly applies to the management of the technical and programmatic aspects of a project when you get to that stage in your career. It also applies to the management of your own time and resources. The ability to prioritize tasks, "multi-task," and satisfy sometime competing demands on your resources (e.g., time and ability) are skills that are frequently called upon. Finally, the ability to clearly document and cogently present your position is required and should be a (by)product of your "mainline" training.

Consulting

Training in psychology can be applied toward the understanding of the user(s). We need to know about the physical, biomechanical, cognitive, emotional, and social needs of people as that relate to the design and development of products, interfaces, communications, and environments. We need to know how to elicit both the explicit and the tacit needs of potential users.

Training in psychology is also an asset in knowing how to work with other people, both internal team members and members and the client team.

COWORKERS

Electronics Industry

You would be working with other user interface designers, graphic designers, writers, computer scientists, and engineers. In my group we are technicians, humanists, and artists.

Loss Prevention Research

Other researchers at the research center come from the areas of industrial engineering, mechanical engineering, electrical engineering, psychology, epidemiology, and allied medical sciences. There is also frequent interaction with technicians and support staff (clerical and shop). As a principle investigator, you must interact with and coordinate the activities of all of these people on a daily basis.

Academia

Despite its often undeserved ivory-tower image, daily life in academia is one that is filled with personal interactions. You will work with

undergraduate and graduate students from all over the world; their many different cultures and customs can make interactions both challenging and rewarding. You will also work with individuals from industry and government, who may have differing philosophies about the purpose of research and teaching. Perhaps the most rewarding interactions will be with other colleagues; generally, you will be in an atmosphere where you will be free to discuss and learn a broad array of knowledge. You will interact with administrators, such as department heads and deans as you try to work through the academic hierarchy. In addition, you will have daily interactions with clerical staff and technicians.

Computer Industry

Engineers, programmers, application designers, information developers, industrial/graphical designers, marketing people, finance people, customers, etc.

Government

You generally work as a member of a multi-disciplinary team, serving as an advocate for the end user which is usually an astronaut. You're responsible for providing solid human factors technical expertise, integrating your objectives with those of other team members to determine a feasible solution. That solution may be refined as resources allow.

Consulting

The structure of the team varies depending upon the industry and the project. Is it a product or an interface or both? Is it an environment? Is it a communication system? The client team tends to be either "engineering-driven" or "marketing-driven," but the collaboration between these two forces is getting stronger over time. Product and interface projects can be engineering driven. Communications projects are more likely to be marketing-driven.

We try to put together an internal team to complement the client's team and round it out. On product and interface projects, we work with industrial designers, and mechanical and/or software engineers. On communications projects we work with graphic and information designers as well as marketing strategists.

APPENDIX A

This section addresses the question of what attributes employers are looking for in a Human Factors/Ergonomics professional by answering the following questions:

- What skills does one need?
- What kinds of hands on experiences are important?
- What is importance of research, teaching, and internship experiences?
- When is a higher degree an asset and when is it a liability?
- What is appropriate balance of breadth vs. depth of knowledge?

SKILLS

Electronics Industry

Having a solid background in Human Factors is not enough. You need to have skills across disciplines. The following skills are required: communication skills (both written and oral), ability to work with a team, ability to coordinate and run usability tests and focus groups. Also, since this is a design group, creativity is very important for product design. The people in my group have many different skills - most have at least two specialties.

Loss Prevention Research

At the research center it is very important to be able to work without supervision, and to provide your own organization and structure to the work environment. You must be able to originate projects and then manage project personnel as required throughout the life cycle of the project. This requirement starts almost immediately upon beginning work. Other skills that are necessary (and common to many work environments) are technical communications skills, computer literacy in at least two or three platforms (i.e. Macintosh, DOS/Windows/IBM, VMS, or UNIX), working knowledge of statistics and experimental design (including appropriate software, preferably SAS), and broad technical competence in ergonomics in addition to your own specialization.

Academia

The skills one needs to be a successful academician are: (1) Interpersonal communication ability, (2) Creativity, (3) Motivation to succeed, (4) Ability to rapidly change your focus between projects, and (5) Tenacity to carry projects/papers through to completion.

Computer Industry

That depends upon the company. Depth of knowledge in the company's specialty (e.g., computers for a computer company) is highly desirable. Knowledge of human factors is key. Demonstrating superior leadership, organizational, and communication skills is essential.

Government

A necessary skill is a solid grounding in human factors engineering. However, this is basically useless unless you can clearly document and cogently present your position. Thus, good writing skills and the ability to logically and persuasively express yourself is very important. Finally, being a self-starter, tenacious, and flexible are important attributes. In terms of credentials, strong academic accomplishments are clearly important, both in classes taken and grades earned.

Consulting

Creativity: The need for generative research methodologies is more critical than the need for evaluative research methodologies in the design development process of the 90s.

Stamina: As a consultant, you are serving the needs of several clients at once and the schedule can be very demanding. There can be a lot of travel if you are on a team with people in another location or if the client is in another part of the country.

Visual and verbal communication expertise: You must be able to communicate your ideas to many types of people. In the design community, visual communication skills are essential.

Knowing when to look for outside experts: Serving so many industries means that you can't be an expert in all of them. You need to know your own limits and invite outside expertise when needed.

Interpersonal intelligence: You will be working with others more often than working alone. You are constantly in meetings, on the phone, video conferencing, faxing, or sending e-mail.

Ability to listen: You must be able to listen as well as contribute.

EXPERIENCE

Electronics Industry

Hands on experience that relates to the type of work the potential employer is doing. Prototyping and designing are important. Familiarity with a variety of tools and operating systems. Even if the employer doesn't use the same tools, just showing that you can easily learn new tools is an asset.

Loss Prevention Research

All work experience is evaluated and considered in the hiring process at the research center. However, since the product of the center is research, previous research in graduate school or any other environment is very important.

Academia

Requirements for "real-world" or industrial experience differ greatly between departments and institutions. It is common for young individuals to start at a university with little experience, but to subsequently gain that experience via research and consulting projects. If required, an institution would like to see an ability to thrive under the tight deadlines and real concerns that one might encounter in the manufacturing or service sector.

Computer Industry

Coop/internship experience is invaluable, especially if it relates to the interests of the company that you are talking with.

Government

Evidence of practical experience is helpful, especially with the tools and processes related to the skill requirements for the position. Generally speaking, basic computer literacy is a must; experience with more esoteric applications is a plus. Hands-on experience with test and measurement instruments is also a plus. Participation in design and/or analysis teams in

"real world" situations can demonstrate technical, analytical, and "person-to-person" skills.

Consulting

In the fast-paced world of consulting, there is no longer the luxury of "on-the-job" training. We would expect Human Factors candidates to be immediately useful and billable to clients. We would only consider candidates who have experience: working in interdisciplinary teams and working in product development for at least two different industries. For junior candidates, these experiences can be in the form of internships.

RESEARCH/TEACHING/INTERNSHIPS

Electronics Industry

In this environment, the importance of teaching is low. Research and internship positions however, are much more important. A large part of my job is conducting consumer research before and during product design. It is important to demonstrate that you can coordinate and conduct research. Internships are very important also - for you and for the potential employer. Its a good way for you to find out what type of human factors work you would like to do while gaining some excellent experience.

Loss Prevention Research

Of research, teaching, and internship experiences, research experience is the most important. Internship experience can be valuable if it is in a research environment, but practical experience can also be important simply since it gives a candidate a broader background. Teaching experience is not very important.

Academia

Teaching and research experience are very desirable for academic positions. The teaching experience should include sole responsibility for lectures and laboratories, if at all possible. Experience spent lecturing as part of a laboratory is still quite valuable, even if you have little experience in front of a large lecture class. Research experience should also be shown through published papers, conference proceedings, or in other ways.

Computer Industry

It is very important to demonstrate that you did an excellent job at whatever you were doing - thinking, solving complex problems, taking initiative, etc. It is also important to demonstrate that you know how to think, and can see things through from inception to completion in a timely way - in an analytical manner and from a system perspective that inter-relates the various components of a product offering (as is often the case).

Government

Since you would be a human factors engineer, evidence of practical experience is important. Internships are probably the best at providing this experience. Research experience, depending on the degree of your end-to-end involvement, can also prove valuable. Involvement only during data collection, for example, is not as valuable as also participating in problem definition, experimental design, and data analysis. Teaching adds value primarily to the extent that it is evidence of expertise in a desired subject area.

Consulting

We would be most interested in a candidate's number and types of internship experiences in industry. Teaching experience would be valuable in so far as it tells us that the candidate can work with people and can communicate effectively.

The importance of research experience depends upon the nature of the research. For example, we may not be interested in a candidate with basic research experience. We would look more favorably upon a candidate with applied research skills in an industrial setting.

HIGHER DEGREE

Electronics Industry

A Master's degree is an asset. Individuals with Ph.D.s sometimes get paid more, but a Ph.D. is not necessary to do this job, so employers would often rather hire a Master's level person with a few year's experience than a Ph.D. with no experience.

Loss Prevention Research

Most candidates who interview at the research center have a Ph.D. There are some interviewees with a Master's degree, but these are in the minority.

Academia

Most assistant professor positions require a Ph.D. This will be specified in the job announcement.

Computer Industry

A higher degree typically shows that a person has solved more complex problems successfully. Thus, the person is a more valuable potential employee. A higher degree could be a liability if one were wanting to be paid for the higher degree, but wanted a lower level job. It is important to look at a variety of jobs but to concentrate on those which make best use of your technical knowledge/training. In almost all cases, regardless of your formal education background, you will find that you will want to take in-house or external courses that maintain/enhance/increase your skills.

Government

A Master's degree is a strong academic and practical experience credential. A Doctorate is even more so, but is probably approaching the point of diminishing return for an entry level position.

Consulting

A higher degree is always an asset as long as it doesn't impair your ability to do applied work in a fast-paced environment. A higher degree does not, however, ensure a higher salary.

BREADTH VS. DEPTH OF KNOWLEDGE

Loss Prevention Research

You need specialization(s) to effectively generate and conduct research projects. However, breadth of knowledge is invaluable in that it allows an appreciation of other disciplines in assembling a project team.

Academia

To graduate with a Ph.D., you must demonstrate your depth of knowledge in a subject area. However, breadth of knowledge may vary quite a bit. You are strongly encouraged to develop the broadest knowledge base you can, as part of your academic program. Any extra courses and projects you take outside your immediate area of interest will only serve to enhance this breadth. Thus, for academia, strive to get the greatest breadth you can, in addition to your depth of knowledge. A broader knowledge base will make it easier to obtain funding from sources outside your immediate area of interest.

Computer Industry

Know two or three things very well. Have overview knowledge of the rest of the field. It will be important for you to do self-evaluations to determine in what direction(s) you want to expand/deepen your knowledge base.

Government

The question of breadth vs. depth of knowledge is difficult to address. Certainly, one must have a working understanding of a broad range of human factors issues and tools to be a competent human factors engineer. Depth in a specialty area will eventually become necessary in your particular "niche." Possessing the skill(s) can enhance your credentials if the skill(s) is(are) currently needed. In any case, you will further develop those skills on the job.

Consulting

As a consultant to many industries, breadth of knowledge is more useful. You must be an objective judge of your own skills, however, so that you know when to call in outside expertise when depth of knowledge is required.

APPENDIX B

This section addresses the following questions related to securing a job:

- When/how should I make contact with potential employers?
- What should my resume look like?
- What is an interview like?

CONTACTING POTENTIAL EMPLOYERS

Electronics Industry

Attend local and national HFES meetings and go to sessions related to your interests. Talk with people, especially the authors. Use the placement service.

Loss Prevention Research

Research positions, when available, are advertised in publications germane to the specialization of the vacancy. Unsolicited resumes are kept on file, but you may have a long wait for the next vacancy.

Academia

In academia, most job announcements are posted in the Fall Semester. Search committees meet by the beginning of the Spring/Winter semester (January), and invite candidates in for a visit during January through April. The job then starts in the Fall semester (August or September). Contact with employers can occur by: (1) simply submitting your resume in response to a posted/published listing, (2) passing your resume to an individual you know at a conference, who will then pass it on to the search committee, or (3) sending your resume directly to a department head with an appropriate cover letter. Direct contact is always better than an unsolicited resume.

Computer Industry

As soon as possible - once you make up your mind that you are serious about looking for a job; you must have had done your "homework" because once you start contacting prospective employers, developments may proceed at a fairly rapid pace. You should be building a network of contacts from the start of your graduate education. Begin by talking with people at conferences like this one, local HFES meetings, friends/colleagues who are already working, etc. - basically, cast a wide networking net.

Government

One of the primary paths to working for NASA is as a cooperative education student. In one sense, this serves as an extended interview. This allows NASA to take a good look at your skills and abilities and also allows you to take a good look at NASA. Following graduation,

provided NASA is hiring, a "co-op" can be "converted" to a full time employee non-competitively. Trying to enter NASA directly, on the other hand, is very competitive. Your credentials weigh heavily in the screening process.

Consulting

The best way to meet potential employers is to become active and assertive in looking for internship positions. It is unlikely that a consulting firm will hire someone fresh out of school with no relevant work experience. Other places to meet potential employers is through conferences and local HFES or ACM groups. The technical groups of HFES are excellent sources of networking and meeting people, especially if you are willing to volunteer to help with newsletters and/or conferences.

RESUME

Electronics Industry

It's important that the potential employer gets an idea of your value to his or her company by reading your resume. They will be receiving many resumes and will not be able to interview all the applicants. You need to sell yourself with your cover letter and resume. You will need to write a separate cover letter for each job you apply. Additionally, you may want to tailor your resume for each job. Write short, concise paragraphs describing your educational background, objectives, skills and research experience. Within each section list things in a chronological order - most recent first. Include references after selected publications.

Loss Prevention Research

A resume should include the following information presented in a concise manner: previous experience (research, industrial, academic, etc.), education, publications/work products, and other skills. The resume should always be accompanied by a cover letter.

Academia

The academic resume always starts with Education, starting with Ph.D. and proceeding backwards. Some include GPA, advisors, and theses, but others don't. It's a good idea to write a paragraph below this with primary and

secondary research and teaching interests. Next list your work experience, most recent first. Follow this with publications, presentations, conference proceedings, and other papers. If you have refereed journals articles, its a good idea to set these apart from your other papers. Next, list research projects, including sponsor, PI, years, and funded amount. Follow this with honors and awards, professional societies, reviewing activity. Finish with references.

Computer Industry

One key thing that we look for is a person's ability to explain how they can be of help to us. Think of what you send to a prospective employer as a letter "selling yourself." Tell me what my need is, how you will solve it, and why I should believe that you can solve it (previous experience...), then include a resume as backup. NEVER think of sending a resume WITHOUT a "cover letter" addressing the preceding points. Keep your letter to one side of a page. Keep the sections in your resume brief (short paragraphs), except don't worry if the publications list seems long. I like to see resumes ordered by objectives, education, work history, project abstracts, references, awards, publications.

Government

In preparing a resume, education, descriptions of major projects, and skills, in that order, are probably most important. Professional history helps support the projects and skills categories. Professional recognition and awards as well as selected publications/presentations also support the projects and skills categories, but more importantly, provides evidence of being a motivated self-starter, tenacious, and flexible, all important personal attributes in considering your employment. Finally, references can certainly help amplify any of these categories, but "faint praise" references should absolutely be avoided.

Consulting

You should take the time and effort to be sure that your career goals and objectives match the philosophy of the job and the institution. A mismatch here may mean that your resume isn't even considered. The most important parts of your resume to elaborate on include:

professional history, abstract of work, skills, and references.

INTERVIEW

Electronics Industry

An interview consists of a long day of half hour to one hour meetings with many of the department members, some managers, and human resources personnel. A "portfolio review" or presentation is done of your work. This can be like a defense depending on who is in the audience. Pick a topic that will be of interest to the audience. In addition to finding out about you, many people work hard to convince you that the job is what you want.

Loss Prevention Research

Interviews for researchers last the better part of a day. The day begins with a tour of the laboratories and discussions/interviews with selected researchers (depending upon availability of researchers and specialization of the candidate). At 11:00 AM, the candidate is required to give an hour long seminar open to the research staff. The topic of the seminar is chosen by the candidate, but should be a report of significant research done by him or her. In the afternoon, candidates finish the day by meeting with the Director of Laboratories and the Director of the Research Center.

Academia

An academic interview nearly always requires a talk or seminar. Prepare high quality overheads, and rehearse this talk. Usually, about 40-45 minutes are requested, and there will be lots of questions. Start the talk broadly, then narrow it down to your specific research project with results. If you haven't finished some part of it, be honest. Faculty have a way of asking questions that you don't want to have asked. Following the talk, you will meet with the: (1) dean and/or associate deans, (2) department head, (3) faculty, (4) graduate (and possibly undergraduate) students, and (5) staff.

Computer Industry

You will probably be asked to do an hour discussion on a major piece of work you have done. Assume your audience will be smart people who are not familiar with your work.

You will probably have many 30-60 minute discussions with technical people on their work. They may ask you "how would you approach this problem..." Also, expect to meet with a few managers, and a personnel specialist. Remember one thing - by the time you show up for an interview, in most cases, this can be regarded certainly as a sign of interest; it may not be so much a case of - is this person capable/competent as - is this person someone that we can work with, is he/she interested in what we do, does this person have good work habits, are they dependable, etc.

Government

Interviews are informal and wide ranging. They can include anything from more details about your credentials to evidence of self-motivation to career and technical goals and objectives.

Consulting

In a two hour interview, you might spend one hour with other HF professionals with whom you would be "grouped." We would probably put you on the spot by asking how you would respond in a series of hypothetical situations. During the second hour you would meet a wide variety of other people from the other disciplines whose purpose would be to determine whether or not you would make a good team player.