Netværk for Kvinder i Fysik
Nyhedsbrev nr. 39
April 2005

Kære Netværksmedlemmer,

Så er det igen blevet det tidspunkt på året hvor KIF årsmødet skal annonceres. Det finder som sædvanlig sted på Hotel Nyborg Strand i forbindelse med Dansk Fysisk Selskabs årsmøde. I år ligger KIF årsmødet onsdag d. 1. juni, dvs. dagen før DFS årsmødet. Programmet og yderligere oplysninger findes på de følgende sider.

Nyhedsbrevet bringer som sædvanlig en del udklip. Heriblandt Time Magazine artiklen: *Who says a woman can't be Einstein.*

Endelig vil nyhedsbrevet gerne ønske tidligere KIF formand Anja Andersen tillykke med ansættelsen som lektor i planetfysik ved Niels Bohr Instituttet.

Indhold:

Siden sidst

Af Cathrine Fox Maule

KIF har i løbet af vinteren i samarbejde med Female Economics Researchers in Aarhus (FERA) lavet en folder om FREJA-projekterne. Folderen hedder "Det betaler sig at støtte kvinders forskning! En præsentation af FREJA-projekterne", og den kan hentes som pdf-fil på KIF's hjemmeside (www.kif.nbi.dk). Folderen giver et indblik i, hvad der er kommet ud af de 16 FREJA-projekter både i form af forskningsresultater og i form af øget synlighed og promovering af kvindelige forskere, og formålet med den er at lobbye for et nyt FREJA-program. Samarbejdet med FERA har været yderst konstruktivt og en sand fornøjelse; jeg vil gerne takke Mette Verner og især Helena Skyt Nielsen fra FERA for en fantastisk indsats.

I januar vedtog Niels Bohr Institutet (NBI) en målsætning om at have 15% kvinder blandt de fastansatte VIP'er i 2015. For at opnå den målsætning vedtog man en handlingsplan for rekruttering af kvinder til forskerstillinger. Planen går blandt andet ud på at man til en given stilling kan vælge at ansætte 2 personer, hvis der blandt de topkvalificerede ansøgere er en kvinde, såfremt de nødvendige midler er til rådighed. Allerede i februar blev rekrutteringsplanen anvendt første gang, da man valgte at ansætte 2 kvinder (Anja C. Andersen og Christine Schøtt Hvidberg) til et opslået lektorat i planetfysik. Således har NBI nu forøget antallet af fastansatte kvindelige VIP'er fra 3 til 5, ud af en samlet stab på 65 VIP'er.

Ligeledes i januar udnævnte Niels Bohr Institutet to kontaktpersoner (Dorthe Dahl-Jensen og Jens Hjorth), som de studerende ved institutet kan henvende sig til, hvis de føler sig udsat for mobning eller sexchikane. Tiltaget er sket bl.a. på baggrund af det fyraftensmøde om sexchikane på arbejdspladsen som KIF holdt i foråret 2004, og vi har siden da været i løbende dialog med NBI's bestyrelse omkring emnet.

For at følge op på sidste Nyhedsbrev kan vi meddele at Professor Dorthe Dahl-Jensen fra Niels Bohr Institutet pr 1/2-2005 blev valgt ind i Forskningsrådet for Natur og Univers. KIF var blandt dem, der indstillede DDJ, og vi ønsker hende tillykke med hvervet.

Kalender over kommende KIF arrangementer:

Fredag d. 27. maj: Pigefrokost på KU, kantinen på NBI, kl 12-13.
Onsdag d. 1. juni: Årsmøde og generalforsamling på Hotel Nyborg Strand.
Onsdag d. 22. juni: Pigefrokost på KU, kantinen på Rockefeller, kl 12-13.
Mandag 8. august – onsdag d. 10 august: Nordic Workshop for Women in Physics i Bergen.

Du kan hele tiden holde dig opdateret om KIF's arrangementer og finde flere detaljer om hvor, hvornår og eventuelle tilmeldingsfrister på vores hjemmeside www.kif.nbi.dk.

KIF Årsmøde, onsdag d. 1. juni 2005 på Hotel Nyborg Strand

Program

10:00-10:15 **Velkomst ved formand Cathrine Fox Maule**
10:15-11:00 **Liv Hornekær**, Århus Universitet: *Overfladefysik og stjernedannelse*
11:00-11:45 **Dorte Nørgaard Madsen**, Universitetet i Bergen: *Going Nano in Scandinavia*
11:45-13:00 **Frokost**
13:00-13:45 **Inge Henningsen**, Københavns Universitet
13:45-14:45 **Diskussion**
14:45-15:15 **Postersession** med kaffe, the og frugt
15:15-16:45 **Generalforsamling**
ca. 19 **Middag** (for egen regning) på restaurant i Nyborg

Hvis du vil med til middagen i Nyborg om aftenen, så kontakt Tina (tic@dmi.dk) der sørger for at bestille bord.

Deadlines

Tilmeldingsdeadline: d. 24. maj 2005.

Posters

Alle opfordres til at tage en poster med. Abstract indsendes via Dansk Fysisk Selskabs hjemmeside:http://www.nbi.dk/dfs/ snarest.

Tilmelding

Det koster 310,- kr. at deltage i årsmødet hvis man ikke skal overnatte. Tilmelding foregår via DFS' hjemmeside, deadline er d. 24. maj. Her findes også oplysninger om DFS' årsmøde på Hotel Nyborg Strand d. 2.-3. juni.

Studenterrejsestøtte

Vi opfordrer andendelsstuderende til at deltage i mødet. Hvis der er problemer med at få dækket registreringsgebyret og rejseomkostningerne af dit institut, så kontakt KIF; vi har mulighed for at støtte.

Togtider:

Afgang Kbh. H: 8:00 ankomst Nyborg: 9:13
Afgang Nyborg: 17:29 ankomst Kbh. H:18:48

Afgang Århus H: 7:30 ankomst Nyborg: 9:28
Afgang Nyborg: 17:14 ankomst Århus: 19:08

Abstracts for foredrag:

Liv Hornekær, Institut for fysik og astronomi, Århus Universitet

Overfladefysik og stjernedannelse

Nye stjerner kommer til verden, når gigantiske interstellare støv- og molekyle-skyer bliver tilstrækkeligt kolde til at kollapse under deres egen vægt. Kemiske processer på overfladen af små støvkorn i de interstellare skyer er med til at styre deres nedkøling. Ved at studere overfladefysiske processer under interstellare betingelser, dvs. under UHV, ved temperaturer omkring 10 K og med materialer der findes i det interstellare rum, kan vi få indsigt i, hvordan disse processer påvirker de interstellare skyers temperaturudvikling og dermed bidrager til at sætte tidsskalaen for stjernedannelse. Vi kan også få viden om, hvordan mange af de kemiske stoffer og præbiotiske molekyler, der var nødvendige for livets opståen på jorden, måske allerede var dannet i interstellare støv- og molekyle-skyer, længe før solen og solsystemet blev født.

Dorte Nørgaard Madsen, Universitet i Bergen

Going Nano in Scandinavia

The nanowave is rolling and also Scandinavian research communities are heading at riding the wave. Efforts are ranging from basic science, increasing the knowledge and insight into this World of Small, to industrial applications, where knowledge and know-how are turned into new or improved industrial products or processes. In this presentation I will present some of the nano-related projects I have been involved in recently.

Inge Henningsen

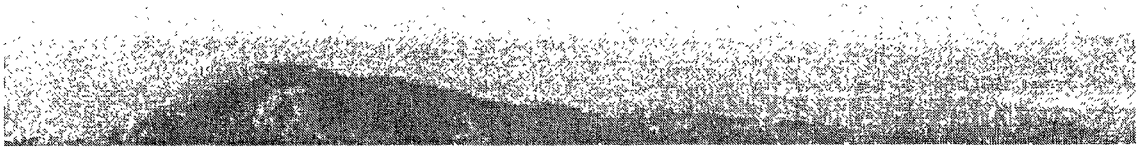
Konstruktion af kvalifikationer i et kønsperspektiv.

I den akademiske selvforståelse er kvalifikationer det afgørende kriterium, når stillinger skal besættes og ressourcer fordeles, og det ligger i luften, at der kan foretages en entydig og endimensional bedømmelse af kvalifikationer.

Med udgangspunkt i stillingsopslag, forskningsplaner og bedømmelser diskuteres hvorledes akademiske kvalifikationer egentlig konstrueres. Inge Lehmans professoratsansøgning vil være et af eksemplerne.

NORDIC NETWORK FOR WOMEN IN PHYSICS

FIRST WORKSHOP BERGEN, NORWAY 8-10 AUGUST, 2005



The first in history meeting of the Nordic Network for Women in Physics will take place in Bergen, Norway, August 8-10 2005 in connection with the World Year of Physics 2005.

Presently existing Networks are Women in Physics in Sweden and Women in Physics in Denmark. There also exists a network for women in physics within Norsk Fysisk Selskap.

One of the main goals of the workshop is to establish Nordic Network for Women in Physics.

The Objectives of NorWiP2005 are:

- To create a network for the exchange of information and knowledge among women physicists.
- To increase the visibility of women working in various fields of physics in the Nordic Countries and to create a data-base of women researchers in the field.
- To facilitate international networking by developing contacts with women in physics organizations around the world.
- To increase the number of women studying physics and working in the field of physics research by identifying gender barriers in the career paths of women in physics and by working towards removing such barriers.

Please register for the First Workshop of Nordic Network for Women in Physics 2005, 8-10 August 2005 on http://www.ift.uib.no/nwip2005/
It will help us if you register early. We cover 2 nights in the hotel for first 80 registered participants (on double room price) and reimburse travel costs for a limited number of students and teachers (first come first served).

More information available at http://www.ift.uib.no/nwip2005/

WHO SAYS A WOMAN CAN'T BE EINSTEIN?

Tekst version af en artikel fra Time Magazine, nr. 7/3 2005

Yes, men's and women's brains are different. But new research upends the old myths about who's good at what. A tour of the ever changing brain

THERE WAS SOMETHING SELF-DESTRUCTIVE ABOUT Harvard University President Larry Summers' speech on gender disparities in January. In his first sentence, he said his goal was "provocation" (rarely a wise strategy at a diversity conference). He called for "rigorous and careful" thinking to explain the gender gap among top-tier tenured science professors. But he described his pet theory with something less than prudence. The most likely explanations, he said, are that 1) women are just not so interested as men in making the sacrifices required by high-powered jobs, 2) men may have more "intrinsic aptitude" for high-level science and 3) women may be victims of old-fashioned discrimination. "In my own view, their importance probably ranks in exactly the order that I just described," he announced.

Cue the hysteria. The comments about aptitude in particular lingered, like food poisoning, long after the conference ended. For weeks, pundits and professors spouted outrage and praise, all of which added up to very little. Then came the tedious analysis of faculty-lounge politics at Harvard, as if anyone outside Cambridge really cared.

The rest of us were left with a nagging question: What is the latest science on the differences between men's and women's aptitudes, anyway? Is it true, even a little bit, that men are better equipped for scientific genius? Or is it ridiculous--even pernicious--to ask such a question in the year 2005?

It's always perilous to use science to resolve festering public debates. Everyone sees something different--like 100 people finding shapes in clouds. By the time they make up their minds, the clouds have drifted beyond the horizon. But scientists who have spent their lives studying sex differences in the brain (some of whom defend Summers and some of whom dismiss him as an ignoramus) generally concede that he was not entirely wrong. Thanks to new brain-imaging technology, we know there are indeed real differences between the male and the female brain, more differences than we would have imagined a decade ago. "The brain is a sex organ," says Sandra Witelson, a neuroscientist who became famous in the 1990s for her study of Albert Einstein's brain. "In the last dozen years, there has been an exponential increase in the number of studies that have found differences in the brain. It's very exciting."

But that's just the beginning of the conversation. It turns out that many of those differences don't seem to change our behavior. Others do--in ways we might not expect. Some of the most dramatic differences are not just in our brains but also in our eyes, noses and ears--which feed information to our brains. Still, almost none of those differences are static. The brain is constantly changing in response to hormones, encouragement, practice, diet and drugs. Brain patterns fluctuate within the same person, in fact, depending on age and ***time*** of day. So while Summers was also right that more men than women make up the extreme high--and low--scorers in science and math tests, it's absurd to conclude that the difference is primarily because of biology--or environment. The two interact from the ***time*** of conception, which only makes life more interesting.

Any simplistic theory is "doomed to fail," says Yu Xie, a sociology professor at the University of Michigan. Xie's research on women in the sciences was cited by Summers in his statement, and Xie

has spent every day since trying to explain the intricacy of human behavior to reporters. "I don't exclude biology as an explanation," he says. "But I know biological factors would not play a role unless they interacted with social conditions."

Unless one appreciates that complexity, it would be all too easy to look at the latest research on the brain and conclude, say, that men may not in fact make the best university presidents. For example, studies show that men are slightly more likely to say things without realizing how their actions will affect others. And as men age, they tend to lose more tissue from a part of the brain located just behind the forehead that concerns itself with consequences and self-control. Generally speaking, the brain of a female is more interlinked and--if one assumes that a basic requirement of the post is to avoid dividing the faculty into two sweaty mobs--may be better suited for the kind of cautious diplomacy required of a high-profile university leader. Of course, to borrow a line from Summers, "I would prefer to believe otherwise."

Now that scientists are finally starting to map the brain with some accuracy, the challenge is figuring out what to do with that knowledge. The possibilities for applying it to the classroom, workplace and doctor's office are tantalizing. "If something is genetic, it means it must be biological. If we can figure out the biology, then we should be able to tweak the biology," says Richard Haier, a psychology professor who studies intelligence at the University of California at Irvine.

Maybe Summers' failure was not one of sensitivity but one of imagination.

LESSON 1: FUNCTION OVER FORM

SCIENTISTS HAVE BEEN LOOKING FOR SEX differences in the brain since they have been looking at the brain. Many bold decrees have been issued. In the 19th century, the corpus callosum, a bundle of nerve fibers that connects the two hemispheres of the brain, was considered key to intellectual development. Accordingly, it was said to have a greater surface area in men. Then, in the 1980s, we were told that no, it is larger in women--and that explains why the emotional right side of women's brains is more in touch with the analytical left side. Aha. That theory has since been discredited, and scientists remain at odds over who has the biggest and what it might mean. Stay tuned for more breaking news.

But most studies agree that men's brains are about 10% bigger than women's brains overall. Even when the comparison is adjusted for the fact that men are, on average, 8% taller than women, men's brains are still slightly bigger. But size does not predict intellectual performance, as was once thought. Men and women perform similarly on IQ tests. And most scientists still cannot tell male and female brains apart just by looking at them.

Recently, scientists have begun to move away from the obsession with size. Thanks to new brain-imaging technology, researchers can get a good look at the living brain as it functions and grows. Earlier studies relied on autopsies or X rays--and no one wanted to expose children or women, who might be pregnant, to regular doses of radiation.

The deeper you probe, the more interesting the differences. Women appear to have more connections between the two brain hemispheres. In certain regions, their brain is more densely packed with neurons. And women tend to use more parts of their brain to accomplish certain tasks. That might explain why they often recover better from a stroke, since the healthy parts of their mind compensate for the injured regions. Men do their thinking in more focused regions of the brain, whether they are solving a math problem, reading a book or feeling a wave of anger or sadness.

Indeed, men and women seem to handle emotions quite differently. While both sexes use a part of the brain called the amygdala, which is located deep within the organ, women seem to have stronger connections between the amygdala and regions of the brain that handle language and other higher-level functions. That may explain why women are, on average, more likely to talk about their emotions and men tend to compartmentalize their worries and carry on. Or, of course, it may not.

"Men and women have different brain architectures, and we don't know what they mean," says Haier. By administering IQ tests to a group of college students and then analyzing scans of their brain structure, Haier's team recently discovered that the parts of the brain that are related to intelligence are different in men and women. "That is in some ways a major observation, because one of the assumptions of psychology has been that all human brains pretty much work the same way," he says. Now that we know they don't, we can try to understand why some brains react differently to, say, Alzheimer's, many medications and even teaching techniques, Haier says.

Even more interesting than the brain's adult anatomy might be the journey it takes to get there. For 13 years, psychiatrist Jay Giedd has been compiling one of the world's largest libraries of brain growth. Every Tuesday evening, from 5 o'clock until midnight, a string of children files into the National Institutes of Health outside Washington to have their brains scanned. Giedd and his team ease the kids through the MRI procedure, and then he gives them a brain tour of their pictures--gently pointing out the spinal cord and the corpus callosum, before offering them a copy to take to show-and-tell.

Most of the kids are all business. Rowena Avery, 6, of Sparks, Nev., arrived last week with a stuffed animal named Sidewalk and stoically disappeared into the machine while her mom, dad and little sister watched. In preparation, she had practiced at home by lying very still in the bathtub. Her picture came out crystal clear. "The youngest ones are the best at lying still. It's kind of surprising," Giedd says. "It must be because they are used to hiding in kitchen cabinets and things like that."

Among the girls in Giedd's study, brain size peaks around age 11& 12. For the boys, the peak comes three years later. "For kids, that's a long ***time***," Giedd says. His research shows that most parts of the brain mature faster in girls. But in a 1999 study of 508 boys and girls, Virginia Tech researcher Harriet Hanlon found that some areas mature faster in boys. Specifically, some of the regions involved in mechanical reasoning, visual targeting and spatial reasoning appeared to mature four to eight years earlier in boys. The parts that handle verbal fluency, handwriting and recognizing familiar faces matured several years earlier in girls.

Monkeys are among our most trusted substitutes in brain research. This week a study in the journal Behavioral Neuroscience shows that stage of life is also important in male and female rhesus monkeys. In a sort of shell game, young male monkeys proved better at finding food after they saw it hidden on a tray--suggesting better spatial memory. But they peaked early. By old age, male and female monkeys performed equally well, according to the study, which was led by Agnès Lacreuse at the Yerkes National Primate Research Center. All of which suggests that certain aptitudes may not be that different between males and females. It just depends on when you test them. (We'll have more to say about those monkeys in just a bit.)

LESSON 2: THE SEGREGATION OF THE SENSES

SO HOW DO WE EXPLAIN WHY, IN STUDY after study, boys and men are still on average better at rotating 3-D objects in their minds? As for girls and women, how do we explain why they tend to have better verbal skills and social sensitivities?

The most surprising differences may be outside the brain. "If you have a man and a woman looking at the same landscape, they see totally different things," asserts Leonard Sax, a physician and psychologist whose book Why Gender Matters came out last month. "Women can see colors and textures that men cannot see. They hear things men cannot hear, and they smell things men cannot smell." Since the eyes, ears and nose are portals to the brain, they directly affect brain development from birth on.

In rats, for example, we know that the male retina has more cells designed to detect motion. In females, the retina has more cells built to gather information on color and texture. If the same is true in humans, as Sax suspects, that may explain why, in an experiment in England four years ago, newborn boys were much more likely than girls to stare at a mobile turning above their cribs. It may also help explain why boys prefer to play with moving toys like trucks while girls favor richly textured dolls and tend to draw with a wider range of colors, Sax says.

Likewise, women's ears are more sensitive to some noises. Baby girls hear certain ranges of sound better. And the divergence gets even bigger in adults. As for smell, a study published in the journal Nature Neuroscience in 2002 showed that women of childbearing age were many times more sensitive than men to several smells upon repeated exposure. (Another study has found that heterosexual women have the most sensitive smell and homosexual men have the least.)

Rest assured, Sax says: none of that means women are, overall, better than men at perception. It just means the species is internally diverse, making it more likely to survive. "The female will remember the color and texture of a particular plant and be able to warn people if it's poisonous. A man looking at the same thing will be more alert to what is moving in the periphery," he says. "Which is better? You need both."

LESSON 3: NEVER UNDERESTIMATE THE BRAIN

UNTIL RECENTLY, THERE HAVE BEEN TWO groups of people: those who argue sex differences are innate and should be embraced and those who insist that they are learned and should be eliminated by changing the environment. Sax is one of the few in the middle--convinced that boys and girls are innately different and that we must change the environment so differences don't become limitations.

At a restaurant near his practice in Montgomery County, Md., Sax spreads out dozens of papers and meticulously makes his case. He is a fanatic, but a smart, patient one. In the early 1990s, he says, he grew alarmed by the "parade" of parents coming into his office wondering whether their sons had attention-deficit/hyperactivity disorder. Sax evaluated them and found that, indeed, the boys were not paying attention in school. But the more he studied brain differences, the more he became convinced that the problem was with the schools. Sometimes the solution was simple: some of the boys didn't hear as well as the girls and so needed to be moved into the front row. Other times, the solution was more complex.

Eventually, Sax concluded that very young boys and girls would be better off in separate classrooms altogether. "[Previously], as far as I was concerned, single-sex education was an old-fashioned leftover. I thought of boys wearing suits and talking with British accents," he says. But coed schools do more harm than good, he decided, when they teach boys and girls as if their brains mature at the same ***time***. "If you ask a child to do something not developmentally appropriate for him, he will, No. 1, fail. No. 2, he will develop an aversion to the subject," he says. "By age 12, you will have girls who don't like science and boys who don't like reading." And they won't ever go

back, he says. "The reason women are underrepresented in computer science and engineering is not because they can't do it. It's because of the way they're taught."

So far, studies about girls' and boys' achievements in same-sex grammar schools are inconclusive. But if it turns out that targeting sex differences through education is helpful, there are certainly many ways to carry it out. Says Giedd: "The ability for change is phenomenal.

That's what the brain does best." A small but charming 2004 study published in Nature found that people who learned how to juggle increased the gray matter in their brains in certain locations. When they stopped juggling, the new gray matter vanished. A similar structural change appears to occur in people who learn a second language. Remember that new research on spatial memory in rhesus monkeys? The young females dramatically improved their performance through simple training, wiping out the gender gap altogether.

In a recent experiment with humans at Temple University, women showed substantial progress in spatial reasoning after spending a couple of hours a week for 10 weeks playing Tetris, of all things. The males improved with weeks of practice too, says Nora Newcombe, a Temple psychologist who specializes in spatial cognition, and so the gender gap remained. But the improvement for both sexes was "massively greater" than the gender difference. "This means that if the males didn't train, the females would outstrip them," she says.

Of course, we already manipulate the brain through drugs--many of which, doctors now realize, have dramatically different effects on different brains. Drugs for improving intelligence are in the works, says Haier, in the quest to find medication for Alzheimer's. "We're going to get a lot better at manipulating genetic biology. We may even be better at manipulating genetic biology than manipulating the environment."

Until then, one solution to overcoming biological tendencies is to consciously override them, to say to yourself, "O.K., I may have a hard ***time*** with this task, but I'm going to will myself to conquer it." Some experiments show that baby girls, when faced with failure, tend to give up and cry relatively quickly, while baby boys get angry and persist, says Witelson at Ontario's Michael G. DeGroote School of Medicine at McMaster University. "What we don't know is whether that pattern persists into adulthood," she says. But in her experience in academia, she says she knows of at least a couple of brilliant women who never realized their potential in science because they stopped trying when they didn't get grants or encountered some other obstacle. "It's much better," she says, "for people to understand what the differences are, act on their advantages and be prepared for their disadvantages."

LESSON 4: EXPECTATIONS MATTER

WE HAVE A TENDENCY TO MAKE TOO MUCH of test-score differences between the sexes (which are actually very small compared with the differences between, say, poor and affluent students). And regardless of what happens in school, personality and discipline can better predict success when it comes to highly competitive jobs.

One thing we know about the brain is that it is vulnerable to the power of suggestion. There is plenty of evidence that when young women are motivated and encouraged, they excel at science. For most of the 1800s, for example, physics, astronomy, chemistry and botany were considered gender-appropriate subjects for middle-and upper-class American girls. By the 1890s, girls outnumbered boys in public high school science courses across the country, according to The Science Education of American Girls, a 2003 book by Kim Tolley. Records from top schools in

Boston show that girls outperformed boys in physics in the mid-19th century. Latin and Greek, meanwhile, were considered the province of gentlemen--until the 20th century, when lucrative opportunities began to open up in the sciences.

Today, in Iceland and Sweden, girls consistently outperform boys in math and physics. In Sweden the gap is widest in the remote regions in the north. That may be because women want to move to the big cities farther south, where they would need to compete in high-tech economies, while men are focused on local hunting, fishing and forestry opportunities, says Niels Egelund, a professor of educational psychology at the Danish University of Education. The phenomenon even has a name, the Jokkmokk effect, a reference to an isolated town in Swedish Lapland.

Back in the States, the achievement gap in the sciences is closing, albeit slowly. Female professors have been catching up with male professors in their publishing output. Today half of chemistry and almost 60% of biology bachelor of science degrees go to females. Patience is required.

Next, Summers may want to take up the male question. In all seriousness. Why do so many more boys than girls have learning disorders, autism, attention-deficit problems and schizophrenia? Why are young men now less likely to go to college than women are? And what to make of a 2003 survey that found eighth-grade girls outperforming boys in algebra in 22 countries, with boys outscoring girls in only three nations? If we're not careful, the next Einstein could find herself working as a high-powered lawyer who does wonders with estate-tax calculations instead of discovering what the universe is made of.

INSIDE THE BRAIN

Even after reaching maturity, the human brain is constantly changing in response to hormones, habits, diet and drugs

Parietal lobe

Once thought to be large in females than in males. Not true

Corpus callosum

A bundle of nerves that connects the two hemispheres of the brain. It develops at different rates in boys and girls

Prefrontal cortex

The CEO of the brain, also called the area of sober second thought. Women may use the prefrontal cortex more often in conjunction with the amygdale when processing emotions

Amygdala

Men may handle more of their emotions in this area, which is less wired to the parts of the brain that handle language

Cerebellum

Long thought to play a role in physical coordination, this area also supports activities of higher learning like math, music and advanced social skills. Like the corpus callosum, it matures at different rates in boys and girls

By Amanda Ripley

With reporting by Nadia Mustafa, New York; Deirdre van Dyk, New York and Ulla Plon, Lulea

SCIENCE IS STILL A MAN'S WORLD

The great majority of scientists and engineers in the U.S. are men, but that has less to do with differences in the brain than with academic history. The balance is changing, slowly, as more women pursue advanced degrees

THE DOCTORAL GAP

Three decades ago, women received only 1 of every 10 science and engineering Ph.D.s. Today, women earn one-third of all science doctorates

AT THE TOP OF THE IVORY TOWER

Women occupy 29% of science and engineering positions at U.S. educational institutions. But they fill only 15% of those positions at the top 50 research universities in these fields:

Sociology	36
Psychology	34
Political Science	24
Biology	20
Astronomy	12
Chemistry	12
Economics	12
Computer science	11
Chem. Engineering	11
Civil engineering	10
Mathematics	8
Mech. Engineering	7
Physics	7
Elec. Engineering	7

LIFE OUTSIDE ACADEMIA

In government and the private sector, women occupy just under one-quarter of science and engineering jobs. As in the academic world, men dominate jobs in the physical sciences and engineering

Percentage of women, by field	
Health sciences	49
Psychology	46
Social sciences	29
Biology	27
Mathematics	14
Computer science	13
Physical sciences	13
Engineering	7

GRAPH: Doctoral degrees awarded in science and engineering, in thousands

GRAPH: Percentage of women in tenured and tenure-track positions at the top 50 U.S. research departments

GRAPH: Employed doctoral scientists Men 77%, Women 23%

WILL TODAY'S GIRLS CHANGE THAT?

When young, boys and girls don't differ much on math tests, but that small gap grows in adolescence. That doesn't make either sex smarter in that subject or other sciences

LITTLE EARLY DIFFERENCE

Math scores on national tests for fourth-graders have been improving, with no statistically significant differences between boys and girls

THE SAT SPLIT

Girls score about 7% lower on the math part of the SAT. One factor may be that more girls than boys from lower-income families take the test

GETTING AHEAD

Boys outperform girls on Advanced Placement exams before college, but that may change as more girls take the elite tests each year

Average grade on AP exam, 2004

	Boys	Girls
Biology	3.23	2.90
Calculus AB	3.09	2.82
Chemistry	2.97	2.63
Physics B	2.84	2.37
Computer science A	2.91	2.48

TAKING THE LEAD

Women have outnumbered men in college for more than a decade, and now more are receiving bachelor's degrees in science fields too

THE ICELAND EXCEPTION

A Land Where Girls Rule in Math

Tekst version af en artikel fra Time Magazine, nr. 7/3 2005

This fishing village of 1,480 people is a bleak and lonely place, even in a country suspended at the top of the world. Set on the southwestern edge of Iceland, the volcanic landscape is whipped by the North Atlantic winds, which hush everything around them. A sculpture at the entrance to the village depicts a naked man facing a wall of seawater twice his height. There is no movie theater, and many residents never venture to the capital, a 50-min. drive away.
But Sandgerdi might be the perfect place to raise girls who have mathematical talent. Government researchers two years ago tested almost every 15-year-old in Iceland for it and found that boys trailed far behind girls. That fact was unique among the 41 countries that participated in the standardized test for that age group designed by the Organization of Economic Cooperation and Development. But while Iceland's girls were alone in the world in their significant lead in math, their national advantage of 15 points was small compared with the one they had over boys in fishing villages like Sandgerdi, where it was closer to 30.
The teachers of Sandgerdi's 254 students were only mildly surprised by the results. They say the gender gap is a story not of talent but motivation. Boys think of school as purgatory on the way to a future of finding riches at sea; for girls, it's their ticket out of town. Margret Ingporsdottir and Hanna Maria Heidarsdottir, both 15, students at Sandgerdi's gleaming school--which has a science laboratory, a computer room and a well-stocked library--have no doubt that they are headed for university. "I think I will be a pharmacist," says Heidarsdottir.
The teens sat in principal Gudjon Kristjansson's office last week, waiting for a ride to the nearby town of Kevlavìk, where they were competing in West Iceland's yearly math contest, one of many throughout Iceland in which girls excel.
Meanwhile, by the harbor, Gisli Tor Hauksson, 14, already has big plans that don't require spending his afternoons toiling over geometry. "I'll be a fisherman," he says, just like most of his ancestors. His father recently returned home from 60 days at sea off the coast of Norway. "He came back with 1.1 million krona," about $18,000, says Hauksson. As for school, he says, "it destroys the brain." He intends to quit at 16, the earliest age at which he can do so legally.

"A boy sees his older brother who has been at sea for only two years and has a better car and a bigger house than the headmaster," says Kristjansson.
But the story of female achievement in Iceland doesn't necessarily have a happy ending. Educators have found that when girls leave their rural enclaves to attend universities in the nation's cities, their science advantage generally shrinks. While 61% of university students are women, they make up only one-third of Iceland's science students. By the ***time*** they enter the labor market, many are overtaken by men, who become doctors, engineers and computer technicians. Educators say they watch many bright girls suddenly recoil in the face of real, head-to-head competition with boys. In a math class at a Reykjavìk school, Asgeir Gurdmundsson, 17, says that although girls were consistently brighter than boys at school, "they just seem to leave the technical jobs to us."
Says Solrun Gensdottir, the director of education at the Ministry of Education, Science and Culture: "We have to find a way to stop girls from dropping out of sciences."
Teachers across the country have begun to experiment with ways to raise boys to the level of girls in elementary and secondary education. Last year Sandgerdi's teachers segregated the 10th-grade mathematics classes after deciding that boys needed intensive instruction. "The girls are strong students, so both the teachers and the students liked it," says Kristjansson. But left alone, "some of the boys had such behavior problems that they spoiled it for the lot."
The high school in Kevlavìk tried the same experiment in 2002 and '03, separating 16-to-20-year-olds by gender for two years. That ***time*** the boys slipped even further behind. "The boys said the girls were better anyway," says Kristjan Asmundsson, who taught the 25 boys. "They didn't even try."
MAP: Sandgerdi
PHOTO (COLOR): COLLEGE-BOUND Margret Ingporsdottir, and Hanna Maria Heidarsdottir shine in math
PHOTO (COLOR): GONE FISHING Gisli Tor Hauksson, 14, plans to quit school in two years

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By Vivienne Walt

Politiken 9. mar 2005 kl. 09:21

Piger bruger hjernen bedst

Trods myter om det modsatte er kvinder bedre til fysik og matematik end mænd.

Af Anne Bech-Danielsen

For omkring halvdelen af os kommer det som en gammel nyhed: Nok har mænd større hjerner end kvinder - men de er ikke mere intelligente.

Tværtimod, har et par stykker af os tænkt i ny og næ, og nu er der belæg for de kvindelige fornemmelser: Isolerer man mænd og kvinder langt ude i ødemarken, viser det sig nemlig, at det er pigerne, der klarer sig bedst i fag som matematik og fysik.

Opdagelsen rokker ved myten om, at drengene bare per genetik er bedre til de naturfaglige discipliner.Det fortæller professor Niels Egelund fra Danmarks Pædagogiske Universitet.
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Undersøgelsen skelner ikke mellem pigernes hårfarve, og skulle derfor også gælde blondiner som Gitte Nielsen. - Foto: Jan Grarup

Udenfor byerne er pigerne i front
I forbindelse med en stor Nordisk Råd-konference for nylig om kønsforskelle i nordiske elevers præstationer, kom det frem, at det ikke er nogen biologisk nødvendighed, at danske piger klarer sig så meget dårligere i matematik og naturfag end drengene:

Uden for bysamfundene i især Island og Sverige ser det helt anderledes ud, viser det sig, når forskerne dykker med i tallene fra den såkaldte PISA-undersøgelse, en international undersøgelse af skolegangen i flere lande.

»Den slags forskelle er det meget interessant at se på, hvis man vil prøve at finde en forklaring på, at det går så galt herhjemme«, siger Niels Egelund, der lægger afstand til den danske psykologiprofessor Helmuth Nyborg Sørensen.

Ødemarker kan give et skævt billede
For et par år siden vakte Helmuth Nyborg Sørensen opsigt med synspunkter om højere intelligens blandt drenge.

»Man vil altid som et gennemsnit kunne forvente et lille bitte forspring i mændenes favør«, siger Helmuth Nyborg i en kommentar til den nye diskussion.

Han understreger dog, at han ikke har set materialet endnu, men advarer imod, at meget små elevgrupper i de nordiske ødemarker kan give et skævt billede.

Islandske og same-piger foran drengene
Det afviser Niels Egelund: »Resultaterne fra i hvert fald Island baserer sig på tusindvis af besvarelser«, siger professoren.

I Island ligger pigerne uden for Reykjavik flere islandske hestehoveder foran drengene i fysik og matematik.

Det gælder ifølge PISA også i det lille samesamfund Jokkmokk, som også har lagt navn til 'Jokkmokk-effekten', som forskerne med et ord, der nærmest runger af ødemark og nysne, har kaldt fænomenet om pigernes høje præstationer uden for civilisationen.

Kloge piger kommer til byen
Ifølge Niels Egelund anslår de islandske og svenske forskere, at pigerne klarer sig så meget bedre i de små samfund, fordi det er deres eneste »adgangsbillet til at komme ind til de store byer og gå på café og møde nogle mænd med andre interesser end fiskeri og jagt«.

»Så kan pigerne virkelig performe. Ellers kan de simpelthen ikke komme væk«, siger Niels Egelund.

.Steering Girls into Science

Tekst version af en artikel fra Time Magazine, nr. 7/3 2005

Forty-five Girl Scouts in Rochester, Minn., spent last Thursday evening solving a crime. Although their three-hour foray into forensics was a bit sugar-coated--the girls, ages 9 to 15, were given cocoa powder to dust for fingerprints and chocolate bars to study teeth imprints--there was also a heavy dose of science and math. The troops measured the "culprit's" footprints to extrapolate how tall he or she might be and used deductive reasoning to eliminate suspects from further investigation. The workshop, organized by IBM for the fifth annual Introduce a Girl to Engineering Day, emphasized another skill crucial to the girls' future success in science and engineering: the troops were advised to spend their 15-minute snack break networking.

You have to catch them young if you want to increase the number of women in the upper ranks of science and math. Otherwise, says Anneila Sargent, an astronomy professor and radio-observatory director at the California Institute of Technology, if you wait until graduate school, "the pot of candidates just isn't that big." Nor is there much turnover on the tenure track. Even after a high-profile push at the Massachusetts Institute of Technology, women accounted for just 34 of the school's 262 science professors in 2003--or 13% of the total, up from 8% in 1993. Says M.I.T. molecular biology professor Nancy Hopkins: "If you were to proceed at the current rate of hiring, it would take 95 years to get to 50%."

Attitude makes a big difference. Research by Stanford University's dean of education, Deborah Stipek, and others indicates that by age 12 children have formed hard and fast beliefs about the subjects at which they excel and those in which they fail. Perhaps that's why last year only half as many girls as boys chose to take advanced-placement tests in physics. To even out those numbers, former astronaut Sally Ride launched a science camp two summers ago that so far has kindled the interests of nearly 800 middle school girls.

Meanwhile, scores of elementary and middle schools have started separating classes by gender in an effort to eliminate the shrinking-violet syndrome. In San Antonio, Texas, for example, a dozen public middle schools offer single-sex math courses, which has helped Latinas, in particular, speak up in class. In a similar vein, North Carolina State University last year became one of several colleges that have created dorms solely populated by female science and engineering students. This year the number of freshmen and sophomores bunking there has more than doubled, to 165. The biggest benefit, according to program director Rachel Collins Butler, in addition to sanctioned study groups and study breaks, comes from live-in mentors, the dozen juniors and seniors who can provide academic pointers as well as pep talks.

Perhaps the ultimate role model for women in science is Shirley Ann Jackson, the president of Rensselaer Polytechnic Institute. The first African-American woman at M.I.T. to get a Ph.D.--in theoretical physics in 1973--Jackson knows a thing or two about overcoming discrimination. Shot at and spit upon by whites while a college student, she went on to do research at Fermilab and Bell Labs. In 1995 she became chair of the U.S. Nuclear Regulatory Commission and in 2003 was elected president of the American Association for the Advancement of Science, the world's largest general-scientific society. In less than five years as the top executive at Rensselaer, in Troy, N.Y., she has managed to increase the number of female faculty members 34%, from 50 to 67, in part by tapping into new funds to add more professors.

Jackson warns that there aren't enough young people (men included) in the pipeline to replace all the talent that flooded the sciences after Sputnik. The looming shortage, she says, will hinder the U.S. economy and national security. So maybe there's a silver lining to the Larry Summers controversy. "It allows us to have a broader conversation about our capacity for innovation," she says. "My focus is on the complete talent pool. It's an all-in proposition from my perspective." --By Julie Rawe Lagt på www.berlingske.dk onsdag den 9. marts 2005 kl. 08:05

Women scientists find it easier than in the past to get their foot in the laboratory door. But few reach the highest positions in academe and industry.

By Peter Gwynne

Women scientists who enter the work force today face a much more level playing field than their predecessors of a decade and more ago. But even now disproportionately small numbers of women make the move up to executive positions in academic and industrial institutions. Several organizations have developed formal and informal programs to mentor women on the way to the top. But individual women and the organizations that employ them still face resistance from entrenched interests.

Women scientists plainly have more opportunities to take rewarding jobs than they did just five years ago. MIT exemplifies the new order. It responded to a pioneering 1999 study that highlighted inequalities facing women faculty by instituting policies designed to level the playing field. "Our study was based on data from 10 years ago, when women made up just 8 percent of the school of science and the school had never had a woman chair," recalls biology professor Nancy Hopkins, who played a major role in the study. "Now the school has up to 13.5 percent women and Maria Zuber as chair of Earth, Atmospheric, and Planetary Sciences." Just as significant, the university has recently appointed former Yale University provost Susan Hockfield as its first woman president.

Some Who Have Succeeded


SHERRI BROWN

Women scientists have made it to the top in other institutions. "Hanna Gray was our president for 15 years," says Janet Rowley, professor of medicine at the University of Chicago. "The director of our cancer center is a woman. In my hematology/oncology section, almost half the professors are women. Their contributions are recognized."

However, the fact that those examples are notable indicates their rarity. And even MIT has had difficulties maintaining its momentum in promoting women scientists. "The numbers of women are still extremely low," Hopkins says. "[Retiring MIT president] Charles Vest called a meeting of nine universities which are all seeing the same difficulty in increasing the numbers of women faculty. We don't really know why it's so difficult."

Part of the problem stems from the paucity of top jobs. "There are many more scientists who aspire to top roles than there are positions; so only the best can get there, regardless of gender," says Sherri Brown, director of chemistry and animal agriculture at Monsanto. In addition, academic and industrial administrators, who are predominantly male, tend to appoint people like themselves to leadership positions. And women scientists still face charges that they cannot spend the long working hours that executive positions demand and that their gender makes them less capable of doing top-notch science than men.

In some cases, women scientists make their own decisions not to pursue the top positions. In Israel's Weizmann Institute, for example, women hold about 8 to 10 percent of tenured professorships, even though women make up 50 percent of graduate students. "That proportion of women professors hasn't changed since I started here 25 years ago," says neuroimmunology professor Michal Schwartz. "My belief is that women leave the system because they choose to." Rowley agrees. "For at least some women, the kind of life they lead and their goals and aspirations may differ from men's," she says. "That must play some role in their career priorities."

In this report, we talk to five women who have made it to the top in the scientific world. Their three key ingredients for success: a personal passion for science, good mentorship, and a powerful determination to overcome all the obstacles along the way.

Passion for Science


Sam Ogden
NANCY HOPKINS

Bahija Jallal, recently appointed senior director of drug evaluation and translational medicine at Chiron Corporation, faced particularly difficult challenges. Born in Morocco, she earned her Ph.D. in Paris and carried out postdoctoral work in Munich. "I had to learn two languages along the way," she recalls. "There were bumps in the road. But the journey would have been much tougher if I hadn't loved the science so much." Mentoring also helped. "One reason I came to Chiron," she continues, "was that it became clear during my interviews that I would have a lot of good mentorship."

Brown had her own problems. "It took a long time to establish myself as a good scientist, strong leader, and good collaborator and colleague," she says. "I found it difficult at times. There were times when I felt somewhat isolated as one of the few women in a leadership role. However, as my network has increased, I have found individuals who have provided help and mentoring."

Science hooked Hopkins when she took a class in molecular biology from James Watson at Harvard University. "I went to work in Jim's lab, and he encouraged me as I became a young faculty member," she says. "After that I found it pretty tough sailing. There was a very small number of women, and they were marginalized. But I loved the science with a passion, was superbly trained, and had wonderful students."

Schwartz also knew at an early age that she wanted to be an academic scientist and to have family. "It's what I always wanted to do," she says. "I never considered that being a woman or a mother of four children should stop me in pursuing my career." That ambition led her to a tenured professorship at the Weizmann Institute at the young age of 34.

Rowley has perhaps the most unusual story. Starting in 1962, she spent 13 years as a part-time researcher because, she says, "I had four children at the time and time with them was one of the more important things I wanted to do." Her obvious scientific brilliance, demonstrated by her discovery of chromosome translocations in 1973, convinced the administration to give her tenure in 1977.

The Benefits of Brilliance


BAHIJA JALLAL

Rowley's example shows that academic scientists don't have to become administrators to achieve rewards. "I assiduously turned down all requests to consider positions of responsibility," she says. "What I was doing in the laboratory was far more important to me than any administrative title. I have won the Lasker Award and have received a National Medal of Science; they mean more to me than being chair of the department, which I never was."

That attitude is not uncommon. "I have seen administrations try very hard to find women chairs without succeeding," Hopkins says. "My guess is that it's also not easy to find men to chair departments. It really is a hard job."


JANET ROWLEY

Whether they concentrate on the lab or the administrative office, women scientists need mentors – the earlier the better. "At the Ph.D. level it's particularly important to find mentors who will support you," Jallal says. "Having good mentoring is very important to anyone who wants to reach leadership levels in science," Brown adds. "It

is critical to have someone to discuss ideas, identify ways to get things done, and to develop an effective leadership style."

Monsanto, which has just earned a place on Fortune magazine's 100 Best Companies To Work For list for the second straight year, has a mentoring program for scientists who want to advance to higher levels in the organization. "It is for both genders, but we encourage promising women to apply," Brown explains. The program matches the mentored individuals with senior scientists in different divisions and disciplines, in order to ensure broad mentoring and to complement the mentoring that occurs naturally within departments and laboratories.

Informal Networking


MICHAL SCHWARTZ

Informal networks can also provide mentoring. In the University of Chicago, the department of medicine has a program for women faculty members who meet for lunch three or four times a year. "We talk about issues such as child care on which the university hasn't made much progress," Rowley says. "I have also been a mentor for a number of women who are now professors in my department. They worked in my laboratory and I helped them achieve their potential." Jallal agrees. "Women need to turn back and mentor other women," she says. "That's one role I take seriously."

Schwartz, meanwhile, regards role models as more important than any active mentoring. "Women will be most encouraged," she says, "by seeing the example of other women who have successfully made it to the top."

Men can also mentor effectively. "It's not necessary for women to have other women as role models or mentors," Brown says. "Our senior leaders have been tremendous champions of women in leadership." And at MIT, Hopkins says, "Provost Bob Brown has mentored several women in engineering."

What steps should young women scientists take to reach the top? "Maintain a genuine interest in science, and when you're applying for jobs, ask other women who have been there about the opportunities for women," Jallal advises. "Seek advice from men and women who understand what can happen," Hopkins adds. "It's certainly possible for women to reach top positions, but it's harder than it is for men." Schwartz summarizes the challenge that women scientists face as they reach for top positions: "It's doable," she says. "It's not easy. But I would encourage every woman to try."

The Woman Physicist's Guide to Speaking

Heidi Newberg

Rensselaer Polytechnic Institute

July 29, 2004

One of the most difficult and important skills for scientists of any gender is giving lectures. Public speaking is a learned skill that requires practice, effort, and building up confidence. Lectures are a tremendous opportunity to tell other scientists what you have accomplished, and to influence scientific discovery. Lectures on research are required in job interviews for all scientist-level positions. In a lecture, a large group of people pays attention to you and your accomplishments for typically 50 minutes, during which they are going to form some opinion about your ability as a scientist.

Women know that the way we dress has a big effect on others' first impression of us, and there are many pitfalls involved with dressing to give a lecture. The most serious wardrobe mistake that can be made by a young woman giving a professional talk is to wear clothing that is designed to make men think about sex. While you might get away with plunging necklines, bare midriffs, low-cut pants, shirts without sleeves, mini-skirts, spiked heels, and overly dangly jewelry in other contexts, even in the workplace, this clothing is far too distracting for a presentation in which you are already the focus of attention. Wearing suggestive clothing is guaranteed to focus your audience on various parts of your anatomy, rather than listening to the message you are trying to communicate. This is confusing to young women, since women are routinely expected to wear such things when they dress up for a "formal occasion." When men dress up for work, they wear a suit. When men dress up for romance, they wear a suit. Women must make a distinction here between appropriate professional clothing, which can look feminine and pretty but not sexy, and appropriate dating-wear, which is supposed to look sexy if you want it to work. I have been at talks in which a young woman has worn clothing that is so distracting that even I have had some difficulty paying attention to what she was saying – and of course when she was finished there was not a single question from the audience. One of the ways a speaker measures the success of her talk is by the quantity and quality of the questions received at the end. If there are no questions, then people either are not interested or had absolutely no idea what you were saying.

The pitfalls of dressing for lectures do not end here. The first thing that happens when you stand up to give your lecture is that the organizer or session chair hands you a microphone. Women typically do not have the deep booming voices that carry over lecture halls, and should use amplification at every opportunity; there is nothing worse than preparing and delivering a perfectly inaudible lecture. The microphone comes with an alligator clip that is designed to attach to the front of a button-down shirt such as is being worn by most men giving talks, and a battery pack that clips to the pocket, belt, or pants waist included in all male attire. Women who are not prepared for this often start their talks with an awkward exchange with the session chair while they try to figure out how this apparatus might be attached. I used to wear men's plaid or striped short sleeved shirts and Land's End khaki pants for lectures, since the alligator clips used to only clip in the direction that men's button-down shirts open. Short sleeved men's shirts look like they could be women's shirts when worn by women, but the extra-long sleeves and wide wrist closures on men's long sleeved shirts make them difficult to feminize. Nowadays, most of the microphone clips can be switched from one orientation to the other, so they can be clipped on to women's shirts as well. If you wear a skirt or pants made of a sturdy fabric, then you have a waistband on which the battery pack can be clipped. Once I wore silk pants when giving a talk, and the battery pack bulged out on

the side, threatening to rip out the pocket. When speaking, I usually wear a wool or cotton skirt, a cotton button-down shirt, and a jacket or vest. If the alligator clip cannot be attached to my shirt for any reason, it can be clipped to the jacket or vest. Fashion boots can be easily worn with a skirt, and if chosen well are a comfortable and secure alternative to heels, which are a trip hazard when nervous and walking on polished floors crisscrossed with temporary wiring.

It is important to test both the verbal and visual presentation of your talk before giving it. Beginning speakers should always practice their talks before giving them (once for hour long talks, 3 times for 20 minute talks, and 12 times for 5 minute talks). Your advisors probably finish their talks the night before or on the plane on the way to the conference, but they only get away with this after long practice and because each talk at this stage in their careers is not as critical. Good speakers make all of their most important points in the allotted time, with sufficient time left over for questions. The shorter the talk, the more planning this requires. If the presentation is being made with transparencies, the important points can be written on Post-It notes attached to each slide as a reminder. PowerPoint slides can be printed out in thumbnail size with reminders written next to each slide. In most cases you can put these on the table next to your laptop. Alternatively you can write your points on 3x5 cards and hold them in one hand. You should practice your talk once in front of friends or co-workers who can offer you constructive suggestions. Listen constructively to any criticism, and revise your talk in any way *you* feel is beneficial. Live audiences give you a better assessment of how your talk will come off under pressure. These practice talks are often more difficult because you feel silly explaining your project to a group of people who know most of the information already, but they are necessary for beginning speakers.

Always test your visuals enough before the presentation to make changes if necessary. If possible, these should be tested in the room in which the presentation will be given. Photographs are often difficult to make out on overhead transparencies (and black transparencies heat up quickly). Computer projected (e.g. PowerPoint) slides often appear different colors in the projector than on your laptop, and innumerable technical problems can be encountered with connection cords, screen resolutions, operating system incompatibilities, movies that will not load or play, etc. Sometimes conference organizers request electronic copies of the talk ahead of time since they will be played on local equipment. Sometimes the speaker brings the talk on her own laptop. In either case, the visuals should be tested by the speaker on the same equipment that will be used for the talk, enough in advance so that technical problems may be addressed. As a backup, always have a copy of the talk on separate electronic media (CD, memory clip, etc.) or available for electronic transfer over the Worldwide Web. Alternatively, the most important visuals can be printed out as transparencies. If you are traveling to speak, your talk should come with you in your carry-on luggage.

When young women start their talks, the first words are often an apology or self-deprecating comment of some sort. I once saw a young woman win one of a handful of national awards for astronomy given out once per year at the American Astronomical Association. In her first sentence, she declared that the judges had made a big mistake in choosing her for the award. Although I think this was supposed to be partly a joke, it was also a statement of her recognition that the research for which she was receiving an award was really the combined work of many minds and fingers. As women, we tend to see scientific endeavor as a web of activity, and to work in groups to accomplish a common goal. It is somewhat foreign for us to think about distinguishing ourselves - moving ourselves up through a ranking or pecking order. The boys learned these techniques on the playgrounds. We were instead learning empathy, understanding our emotions, and helping each other in daily chores. It is true that for any award there may be many others as equally deserving of the award as the person who received it, and that no great scientific discovery is really the result of just one person's work and ideas. However, each of those awards is deserved.

With each general tendency I identify between the way women and men conduct their lives, I ask myself whether this trait makes women less capable as scientists. Working together in daily chores can be an advantage to the pursuit of new knowledge. However, the expressions of self-

doubt are distracting and serve little purpose in a lecture. It is somewhat of a taboo in a circle of women to assert or assume that you know everything. It is a sign of weakness for men to question their own abilities. If a woman shows through her words and manner that even she does not believe in her own abilities, then a man will find it quite reasonable that he should not believe in them, either. So don't start out communicating your self-doubt, and don't slip it in periodically as you speak. Listen to yourself when you practice the talk, and make sure you sound confident.

A particularly important example of why the male way of thinking can be a real asset to communication involves answering a simple question posed about research results. Sometimes I have been asked what the size scale of an image that I am presenting is, or how long it takes for a dwarf galaxy to orbit around the Milky Way, and I have said, "I don't know." Big mistake. While it is sometimes okay to say "I don't know," in a dismissive way that communicates "I don't know, I don't care, and it is not important" when asked a detailed question about a fine point you have not thought about, the questioner will be much more satisfied and everyone will learn more if you tell the audience what you *do* know about the question. The person who asked what the scale of my image was did not care whether it was 5 arcminutes or 10 arcminutes, but would have been happy to know that it was at least not arcseconds or degrees. I knew that it was a piece of a 13 arcminute image, but did not know how big the piece was so I simply said, "I don't know." This answer gave the audience the impression that I did not have any idea what I was talking about.

In that same lecture, a physicist asked me what a quasar was. Now, of course I knew that most astronomers think that a quasar is a black hole with stuff falling into it in an accretion disk, and that for some reason it is ejecting charged particles along its magnetic poles. But I haven't critically reviewed the literature and I don't *know* that's what it really is, and I do not understand the physics of how energy of stuff falling in with the accretion disk is channeled into charged particles spewing out of magnetic poles, so my first reaction was to say, "I don't know." It is a much simpler answer than the complex thoughts I am having in response to that question. I then realized that was the wrong answer, and communicated basically what I have said above while waving my hands around and saying that was a hand-wavy answer. Although I think my answer was a fair assessment of the definition of a quasar as I know it, I am afraid it lacked the clarity and confidence that would have given the audience confidence in my answer. I communicated instead my incredible ability to lose confidence in myself.

After the talk, the head of the laboratory came up to me and said, "You know what your problem is, you do not say what you know." My first (internal) reaction to this was angry and defensive. I grouped this comment with a consistent history of people who had come up to me after my talks to give me negative feedback. Ever since I had started giving professional talks in graduate school, someone important had given me a negative comment or suggestion for improvement after every talk. And I heard the criticism loud and clear while I barely registered the positive remarks I received (those after all, were expected). I had become more nervous about speaking with every negative comment from a senior scientist. I realize now that the laboratory director was really trying to help me out – the best way a male scientist born well before 1945 knew how. Those of us who have been mothers or wives know that the best way to effectively deliver criticism is to mix praise with criticism, and we would never start with anything like "You know what your problem is ..." It took me a long time to hear the rest of the sentence. Maybe if I had been a male he wouldn't have said this to me at all, or I wouldn't have heard it, or I wouldn't have made the mistake in the first place. It is an advantage for us as women if we can hear this criticism, ignore the parts that are unfair, hurtful, untrue, and break down our confidence, and use the helpful parts to improve our performance in our careers. Our most devastating disadvantage comes from ignoring the helpful information and dwelling on the voices that doubt us.

Before any talk, it is important to figure out what you would like your audience to remember after it is over. There are some people who are very good at listening, and will hear and understand every sentence that you utter. Most people, myself included, lapse in and out of attention during the presentation. One way to reach those with questionable listening talent is to

outline the main points that you are going to present right up front, when they're still awake. Then, you spend the body of the talk explaining the main points, being sure to spend sufficient time explaining each plot, picture, or idea. You then end with the conclusions, which reiterate the main points you want to get across, trying to keep them all on the same visual if possible. The visual parts of the presentation should be self-contained and self-explanatory. Some people don't listen well, but read everything on the slides. The labels on all plots should be large enough and the symbols defined well enough that the person who returns to consciousness in the middle of your description of the plot can attempt to catch up with you. At the end of the talk, which you end by saying, "I will end there," or "Are there any questions?" your list of conclusions should still be visible. Many people in the audience at this point are going to search themselves for questions, and the conclusions will jog their memories as to what you have said. It aids in the formulation of questions, which are one of the more important components of the talk.

For the beginning speaker, the prospect of a question can be daunting. No one, even the most expert researcher in your particular area, will know the answer to every question. What is important in the question session is to make sure you understand the question – sometimes by repeating it, to think about what you know about the answer, and to answer it as fully and correctly as you are able, while displaying confidence in your answer. People ask questions for many reasons. Sometimes, they ask a question because there is something about your talk that they truly do not understand. Sometimes they ask a question because they do not believe something that you said. Sometimes they ask a question in an attempt to cut you down and make themselves look important. Sometimes they ask a question to make themselves look knowledgeable. And sometimes the question is merely an attempt to get you to speak some more because they are interested. Whatever the question, it can be answered with respect and dignity, to the fullest extent you know the answer, and without apology for those parts you do not know or techniques you have not tried. Try to spend more time telling us what you *do* know or think about than what you do not. If a question is very detailed or in your opinion not of general interest to the audience, you can offer to answer a complex question in person after your talk; but do not overuse this response as it could be interpreted as "I don't know."

Do not worry if you do not get everything exactly correct, but just try your best. It is an advantage of your colleagues that they do not remember ever having been wrong. I learned a lot about the male mind one day from my husband, who is also a scientist. He was pouring water from a plastic bottle into a glass, and when setting down the bottle managed to knock both the glass and the bottle off the kitchen table. He caught the glass before it fell, but the bottle and its contents spilled out onto the floor. He turned to look at me and said, "Hmm, it's a good thing I noticed that the bottle was plastic and saved the glass instead, or we would have had broken glass on the floor." I thought, "The guy just knocked a bottle of water off the table and all over the floor, and his reaction is to congratulate himself on not having broken the glass as well!" The ability to see your own faults can be a big advantage to making scientific discoveries or managing a project, but it can also be major handicap. The men are just forging ahead and getting work done while we are reflecting on how we could have handled it all better.

Women who have on previous occasions responded to male egos with paralysis, and discovered to their surprise that they are therefore not thought to be intelligent, sometimes react by covering their insecurity with anger and frustration. Instead of respecting the question and answering in the best possible way, they attack. It is altogether too easy for a woman to be labeled, "difficult," because of her negative reaction to a playing field that she never understood, and a lower ranking in the pecking order (that she never understood she was fighting for) than she thinks she deserves.

And always keep smiling. There are men out there who walked into the room not understanding why you are pursuing your career in the first place. If you give them the impression that you are not enjoying it, or are not successful, they will be sure you will not survive in your career. In hiring decisions and conferring awards, a scientist's enthusiasm and commitment to the

field are often held in even higher regard than the assessment of talent. In a world that judges us on the success of our associates, who wants to risk a relationship with a person who might not be serious about continuing? Women hear the doubts, the criticism, and the fears of the scientific community loud and clear, even when unspoken. If we turn that external doubt into self-doubt, then our failure to succeed becomes a self-fulfilling prophecy.

Note from the author:

The Woman Physicist's Guide to Speaking does not cover all issues faced by women physicists, but instead gives one example that partially illustrates the tilted the playing field. Very rarely does a male physicist ever face a clothing issue, miss the need to establish a pecking order, or waste energy on water that has flowed under the bridge. Men are never assumed to be products of affirmative action or accused of sleeping their way to the top. Physicists usually do not question the sensibility of their male colleague's career choices or wonder whether they will leave the field when they become parents. All male physicists have to think about is doing their job, and doing it well.

The good news is that the great majority of the barrier to becoming a successful woman physicist in today's climate can be overcome by making very small changes to ourselves. How hard is it really to put together a few good outfits for giving talks, to learn to speak with confidence, and to curb our response to negative feedback? And if we do this, our natural abilities to handle several issues at once, work and manage teams, communicate, prioritize our time, and pay attention to details will make it even easier for us to succeed in our chosen career.

Women and Science Headlines - 16:

Contact persons: vera.fehnle@cec.eu.int <mailto:vera.fehnle@cec.eu.int> - robert.o'meara@cec.eu.int <mailto:robert.o'meara@cec.eu.int >

RECENT DEVELOPMENTS:

Women & Science Report

The Commission's latest official document "Women and Science: Excellence and Innovation - Gender Equality in Science" has been published, in response to the European Council's request to the European Commission for full details on Women & Science activities since 2001.

The report sets out the actions on-going and under preparation at European level to promote the role of women in science, detailing some of the major statistics relating to the current state of this gender issue and the effects of various initiatives and projects. The focus of future priorities is based on the results of the actions to date. For the future, a further €5.7m has been earmarked for Women and Science in 2005-2006, bringing the total in the Sixth Framework Programme to around €20m. The Commission will give €2m to start up the European Platform of Women Scientists, which will establish networks of women scientists and organisations working towards gender equality in scientific research. The Commission is also proposing the creation of a European award on excellence in gender research, to raise awareness of the importance of such research.

You can download a copy of the report at the following web address:
http://europa.eu.int/comm/research/science-society/women-science/women-science_en.html

Science in Society Forum 2005

The Science in Society Forum 2005 took place in Brussels on the 9-11 March. Some 840 delegates attended the event and the 42 participant information stands were divided into three main clusters: Popularisation of Science, Debates and Participatory Process and Addressing Groups of Society. Over the two and a half days of the event, the various sessions were themed as follows: 1) Towards a Communication Culture, 2)

Science, Technology and Democracy, 3) Relevance to Lisbon's objectives and 4) Diversity, Inclusiveness & Equality in Science.

Session 4 - Fostering diversity, inclusiveness and equality in science looked at how better quality research can be gained through the integration of gender and ethical issues. There was also a screening of ***Femmes de Tête***, the documentary that the Commission co-produced with ARTE last year, after which there was a Q & A with the filmmaker, Hervé Nisic.

Please Note: A new **call for proposals** covering 'Science Events' and 'Science in Society beyond FP6' is now open, the budget is €2.2million and the closing date is 24 May 2005. For more information, click on the following link: **http://fp6.cordis.lu/fp6/call_details.cfm?CALL_ID=199#**

DG Employment announces Institute for Gender Equality

Following a request by the European Council and approval by the European Parliament, International Women's Day saw the European Commission make the significant announcement of the commitment of €52.5 million to the creation of a European Institute for Gender Equality.

The Institute will be an independent centre of excellence at European level. It will gather, analyse and disseminate reliable and comparable research data and information needed by policy-makers in Brussels and in the Member States. It will also have a documentation centre and a library which will be open to the public.

http://europa.eu.int/comm/employment_social/news/2005/mar/genderinstitute_en.html

PERSPECTIVES: Women & Science - Future Events

Enwise Follow-Up Workshop

After the success of last September's Enwise valorisation conference in Tallinn, Estonia - we are pleased to announce that a follow-up workshop is currently being organised and is set to take place over two half-days, 25-26 April 2005. The provisional title for the workshop is "Implementing Enwise Results" and our collaborators from last year's conference, the Archimedes Foundation, are busy making preparations for the event, which shall be held in the Reval Hotel Central, Tallinn, Estonia.

If you would like any more information on this event, please contact Robert O'Meara, Robert.O'Meara@cec.eu.int or Margit Lehis, margit@irc.ee

NETWORK NEWS
Women In Technology International
The 11th WITI Annual National Conference will take place in Los Angeles, California on 5-6 May 2005. The event promises to bring together many prominent women in the technology and enterprise sector in the USA. For further information, please proceed to the following website:
http://www.witi.com/magazines/news/conf2005/

The 13th International Conference of Women Engineers and Scientists

The International Conference of Women Engineers and Scientists is set to take place between August 26 and 29, 2005, in Seoul, Korea. The ICWES13 is a dynamic, international conference for women engineers and researchers under the theme "Women Engineers and Scientists: Main Force to Reshape the Future World". For further information, please proceed to **www.icwes13.org**

Ung nano-forsker modtager hæderspris

Lektor på DTU, Jane Hvolbæk Larsen, modtager i morgen en hæderspris for fremragende videnskabeligt arbejde. Oveni hæderen følger en check på 100.000 kr.

Af Sami Don Petersen sdp@ing.dk | tirsdag 08 03 2005 kl. 14:33

For 36. gang uddeles »Fabrikant Ulrik Brinch og Hustru Marie Brinchs Legat«. Prisen går fortrinsvis til yngre danske videnskabsfolk, der har præsteret fremragende videnskabeligt arbejde inden for medicin, teknik eller landbrugsvidenskab. I år går belønningen til Jane Hvolbæk Larsen for hendes arbejde inden for nanoteknologi.

»Jeg vidste slet ikke jeg var nomineret. Så det var en dejlig overraskelse og det bliver fantastisk spændende at modtage legatet. Jeg tager det som et skulderklap, og det er rart, at der er nogen der lægger mærke til det, jeg laver. Nu bliver der råd til en bedre sommerferie, måske en lille udlandsrejse«, siger Jane Hvolbæk Larsen.»

Jane Hvolbæk Larsen har udmærket sig ved at være den første forsker inden for nanoteknologi, der viser, hvordan et metals egenskaber kan ændres ved at dyrke det som enkelte over-lag med en lille ændring i afstanden mellem atomerne.

Ny dimension på det periodiske system
Prismodtageren finder det fantastisk spændende at arbejde med nanoteknologi:

«Det er fascinerende at kunne lave et materiale, der gør lige præcis, hvad man vil have det til at gøre. Det giver mulighed for at skabe en ny dimension på det periodiske system, hvor man udover at blande to metaller kan designe det perfekte materiale ved at ændre den elektroniske struktur».

Hun har også medvirket til at vise, hvordan overfladedefekter fuldstændigt kan dominere materiales egenskaber. Det er specielt denne nye forskning, som er anledning til, at Jane Hvolbæk Larsen hædres, og samtidig modtager 100.000 kr.

Fra atomare strukturer til industriel katalyse.
Jane Hvolbæk Larsen er uddannet civilingeniør, og fik sin ph.d. i september 1998 i Center for Materialefysik på Atomart Niveau (CAMP). I dag er hun selv lektor og bachelorstudieleder i Fysik og Nanoteknologi på DTU i Lyngby.

DTU har nydt stor gavn af Jane Hvolbæk Larsens forskning. En anden af hendes bedrifter er opbygningen af et vakuum facilitet i et mikroskop, hvorved at man kan bruge et «scanning tunneling microscope» (STM) til at studere overflader med atomar opløsning. Mikroskopet gør det dermed muligt at fremvise nye resultater om den atomare struktur af nanopartikler deponeret på overflader, forklarer DTU-forskeren:

«Nanopartiklers form spiller en afgørende rolle inden for f.eks. industriel katalyse, da reaktiviteten af katalysatoren ofte domineres af få specielle atomare strukturer på overfladen af katalysatorpartiklerne. Så det grundforskning med industriel anvendelse, fortæller Jane Hvolbæk Larsen».

Efter et ophold ved University of Washington, hvor Jane Hvolbæk beskæftigede sig med mikrokalorimetri, fremviser hun resultaterne i Danmark. Mikrokalorimetri var en helt ny teknik, hvormed atomers og nanopartiklers adsorptionsvarmer kan måles, mens de blev deponeret .

Overrækkelsen af prisen finder sted på Danmarks Tekniske Universitet i Lyngby onsdag den 9. marts kl 12.30.