Message from the Director

Scientific collaboration represents a cornerstone of modern scientific inquiry. While modern science has been traditionally practiced by individual investigators, the “low hanging fruit” of scientific discovery possible in the hands of the solo investigator has been significantly thinned. The challenges facing translational hearing science in the twenty-first century differ depending on whether the problems are genetic, developmental, behavioral or technological, but all demand teams of dedicated individuals to collaborate. These collaborations may be local or global but all are characterized by synergistic skills and knowledge, mutual respect and friendship. The Virginia Merrill Bloedel Hearing Research Center is proud to foster such collaborations and it has been my honor to assist the individuals described in our latest newsletter with the Center’s resources as they conquer scientific challenges, cultural differences, political upheaval and geographic distance to deliver the knowledge necessary to diagnose, prevent, treat and rehabilitate disorders of hearing and balance. Some of these collaborations have been maintained for many years, some are new. All bring knowledge to our field that would not be possible in their absence. We are blessed by the wisdom and generosity of the Bloedel family in that they recognized long ago that scholarship across institutional and international boundaries would be critical for the University of Washington to remain pre-eminent in hearing and balance research. I hope you find the following stories of scientific collaboration as inspiring as I do. They represent only a fraction of such efforts facilitated by the Virginia Merrill Bloedel Hearing Research Center. In future editions of this newsletter, I hope to introduce to you to many more.

Sincerely,

Jay T Rubinstein, MD, PhD
Virginia Merrill Bloedel Professor & Director
Professor of Otolaryngology-HNS and Bioengineering

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On the cover: This image shows spontaneously regenerated hair cells from the adult mouse utricle following the ablation of all hair cells by diphtheria toxin in a new mouse model designed by Dr. Edwin Rubel and Dr. Richard Palmiter. Microphotography by Dr. Jennifer Stone
Virginia Merrill Bloedel Hearing Research Center Scholar

When Prentice and Virginia Merrill Bloedel envisioned the research center that would bear Mrs. Bloedel’s name, they planned to endow three research positions. Two of these are the endowed chairs: the Basic Science Chair held by Dr. Edwin Rubel, and the Clinical Science Chair, held by Dr. Jay Rubinstein. With so many disciplines producing ideas and research invaluable to understanding hearing loss, how to structure the third endowed position was perplexing. The solution was born of a simple idea: what would happen if dedicated and talented faculty members with great ideas for research could have three focused years to carry out their best ideas? This was the beginning of the Bloedel Scholars program. Bloedel Scholar awardees, with department approval, are able to relinquish significant teaching and administrative duties for a three-year period to pursue cutting-edge research. We attract applications from top faculty and the choice for each award granted is invariably a difficult one.

To be eligible for the Bloedel Scholar award, applicants must be regular tenured faculty who are Bloedel Affiliates and who hold external research funding. Because we draw affiliates from such a diverse range of disciplines, the opportunities for fostering and sharing research are many. For a full profile of this year’s winner, Dr. Les Atlas, see below. Our last Bloedel Scholar in 2007 was Dr. Kelly Tremblay, whose multidisciplinary research focuses on the biological aspects of hearing loss in aging and how to design optimal rehabilitation programs.

Professor Les Atlas receives Bloedel Scholar Award

How Music Inspired an Engineer

The Virginia Merrill Bloedel Hearing Research Center is proud to support multi-disciplinary collaboration with the Bloedel Scholar’s award. Awarded to a Bloedel affiliate every three years, it enables the winner to focus on research for a three-year period.

Our 2012-2015 winner is Dr. Les Atlas, a professor in the Electrical Engineering Department. While underscoring the Center’s collaborative focus, the choice of Dr. Atlas for this award is also a story of one man’s lifetime fascination with sound and a race with time to contribute to research that could alleviate his own hearing loss.

Atlas has been intrigued by electronics and engineering since childhood. When asked how his lifelong curiosity began, the answer came without hesitation.

“My parents wouldn’t let me watch TV,” he began. “My father would remove the TV tubes before he and my mother went out,” continued Atlas. “I had to learn how to reassemble the components to be able to watch TV!” He also recalls a detention that backfired. The detention room contained the school’s telephone closet – an irresistible lure for the bored child. When the adult technicians summoned to restore functionality were baffled by the young Atlas’ innovations, he was brought back to reinstate service. This early talent for electronics and a love of music led to a career in guitar amplifier innovation, with a clientele that included several legendary guitarists.
When his push to design a more powerful guitar amplifier led to what Atlas calls “a surprising and expensive explosion”, he returned to the university. “My approach was lacking in depth,” he admitted. He enrolled in an engineering program to refine his approach. The nuances that differentiated his favorite musicians were the driving force behind his electrical engineering studies: “I was fascinated with the nature of different sounds,” he says.

One of his first undergraduate activities was to use an oscillator to study sound waves. “Our ears ‘like’ variation in sound,” explained Atlas. “Remember the movie ‘Fantasia’? Disney used HP (Hewlett Packard) oscillators to produce that otherworldly sound. It fascinated me. One of the first things I did was to put that sound made by an oscillator through an amp and a speaker. I realized that the most interesting part of the sound was not when it was steady but when it was changing in tone and frequency, that’s where the information is. Furthermore, that’s what your brain likes. It notices the change in the character of the sound but tunes out the steady stuff.” But the methods he was taught that so perfectly described steady sounds - AM and FM radio concepts from the 1930s and 1940s - were unable to express the character of rapidly occurring variations in sound.

Frustrated by the limitations of the signal processing theory he was learning, Atlas knew he’d found his career path. “Here was a real gap that needed to be filled. It needed to be characterized in a sweeping, deep way. That’s what I’ve been working on ever since.”

Time frequency analysis, a methodology used to describe and manipulate signals that are short in duration and that change greatly, was the key to answering his questions about sound. Merely understanding the mathematics that describes those signals wasn’t enough. With his musical passion, Atlas also wanted to understand how the ear perceived sound and to learn from them so that together, they can create better solutions for hearing devices.

That’s where the Bloedel affiliate program comes in. Being able to spend time with people doing hearing research and who are taking radically new approaches is invaluable, he related. “It wasn’t just my personal interest due to my own hearing loss; it was also my knowledge that I was working on some radically new approaches that I really didn’t know how to explain in the right terms to get them outside my small theoretical mathematical community. So I really need to interact with people who can help me put it into terms that make sense scientifically and are useful clinically.”

Now he is using 4G and Wifi technology concepts to better understand the complex nature of speech and make possible vastly improved technology for hearing aids and cochlear implants. This radical new approach initially didn’t find universal acceptance.

He found support from colleague Bishnu Atal, a renowned engineer known for his many achievements in speech analysis, synthesis, and coding while with Bell Laboratories, and who is now an affiliate professor in the UW’s Department of Electrical Engineering. Many of Atlas’ ideas that initially were deemed radical have become the basis for such ubiquitous inventions as the cellphone.

These advances heralded a critical time for the electronics industry. Atlas points out that the size of the market for hand-held and related devices is projected to be greater in the next 10 years than the pharmaceutical and automotive industries combined. With that market force comes welcome new energy for research, and that circles back to what really drives Atlas: the unanswered questions about how we hear and why we hear the way we do.

He is enthralled by our ability to focus on some sounds and shut out others. “It’s fascinating that we can do it so well! I can do it with one ear – one ear! How does that happen? According to conventional mathematics which model how the ear might work, that shouldn’t be possible.”

Neither does he forget the human suffering that attends hearing deficits. “Other people have hearing loss that really isolates them; I see them trying so hard to do their best in social situations,” he said. As a child, he saw his grandfather and father lose their hearing late in life and realized that someday he, too, would struggle to hear. “It’s an attribute of being a male in my family,” he said.

Now this music lover and scientist faces his own hearing loss, even as he works to revolutionize the technologies that help others to hear. “Huge breakthroughs are needed in this field,” stated Dr. Atlas. “The Bloedel award is a huge help and a validation.”
From an early age, Dr. Julie Bierer has been interested in the brain and how we process sound. The daughter of an otologist, Bierer grew up with an appreciation of the agonies of hearing loss and disequilibrium-related maladies. She recalls that Meniere’s disease, the malady that causes random episodes of disequilibrium, was her father’s passion and the focus of his career. Julie Bierer found herself drawn to the problems faced by people with hearing loss and their struggles to communicate. “So many people with hearing loss are sad; it’s very isolating. It motivates me to want to help them.”

To that end, she embarked on her Ph.D. in neuroscience at the University of Michigan. She relates that in the late 90’s, as she was starting graduate work, researchers were beginning to provide people who were deaf with multichannel cochlear implants. These early implants, while a definite improvement over single-channel implants, still had a long way to go in helping the majority of individuals with profound hearing loss.

“I was really interested in how we can make the electrical stimulation through an implant be as similar as possible to what happens in a normal human auditory system,” she explained. Her Ph.D. thesis examined patterns of auditory cortex activation in an animal model, comparing responses to normal sounds with responses to cochlear implants. The goal was to learn how the implant could be manipulated to activate the brain, causing it to mimic the normal response to sound. Bierer followed her Ph.D. with a postdoctoral fellowship and a Master’s degree in Audiology. Clinical practice partly fulfilled her desire to help individuals with hearing loss, but she obtained a university faculty position in which the majority of her time is spent on translational research and teaching. “You can’t do it all,” she said. Coaching newcomers in the field is a part of her work that she finds fulfilling. “It’s fun to teach people. It’s rewarding to see them grasp a difficult concept or see their passion grow,” she said.

Julie Bierer’s research is aimed at identifying healthy and unhealthy regions in the cochlea with the goal of targeting the healthy areas for the delivery of speech information, which could lead to better speech understanding by cochlear implant users. Her training in neurophysiology has made her an expert on how the nervous system functions. To accomplish her goal of improving hearing in cochlear implant users, she works with scientists in many fields.

“It’s always a team effort with implants,” said Bierer. She works with psychologists, engineers, neurophysiologists, audiologists, radiologists, surgeons, and applied mathematicians to build a knowledge base of about how the ear processes sound, about sound itself, and about the technology used by implants that simulate the function of the ear.

Her collaboration with Robert Carlyon at the University of Cambridge in the UK began when he invited her to speak at a conference on implantable auditory prostheses. “I was impressed with his expertise,” she recounted. “I wanted to work with someone who was a guru in psychophysics because I wanted to learn how to better design psychophysics experiments.” Carlyon has become a friend and a dynamic research partner. “He’s funny and brilliant, and research is fun for him,” Bierer said.

Carlyon’s rich background and accomplishments in the field of psychoacoustics, access to resources not available in the U.S., and network of other prominent UK researchers in the field held promise for accelerated research. When Bierer became eligible for a sabbatical, she knew that the Carlyon lab in Cambridge could take her research to another level.

A Travelling Scientist grant from the Virginia Merrill Bloedel Hearing Research Center made the research sabbatical possible. Bierer’s work with Carlyon also included collaboration with other notable British researchers in the field of improving implantable prostheses, including Ian Winter, a prominent neurophysiologist, and Brian Moore, an acclaimed expert in auditory perception who is known as the father of psychoacoustics (the study of sound perception). Bierer and the British researchers also took advantage of her time in the UK to create grant proposals, present at the British Society of Audiology and prepare a poster for the 2013 ARO (Association for Research in Otolaryngology) conference. Their work continues by long distance. Ultimately, Bierer hopes to replace CT scans and time-intensive behavioral experiments with a system that uses a few fast clinical measurements to locate healthy neurons and provide a high level of function for cochlear implant users. The system would save patients time and inconvenience while also providing them with optimal function. “That’s my dream,” she concluded.
Prof. Mary-Claire King and Prof. Karen Avraham live on opposite sides of the planet, but the strength of the bond they share is obvious. The story of their quest to find the basis for inherited hearing loss in families in the West Bank, that territory split between Palestinian and Israeli control, is one of cooperation across borders, cultures, religions, and time zones.

Across Borders – the International Collaboration of Prof. Mary-Claire King and Prof. Karen Avraham

In recounting the 18-year history of their scientific partnership, both women showed a profound respect for each other and for the international network of colleagues who have been so crucial to their success. How did it all begin?

“I first spoke with Mary-Claire because we had identified a gene that I thought might [explain the cause of hearing loss in] a family that her lab had been studying for a number of years,” remembered Karen Avraham. “This turned out not to be the case, but the conversation provided a wonderful opportunity to meet Mary-Claire even before starting my own lab, so we already knew each other before her first visit to Israel.”

Mary-Claire King was at that point known for her discovery of BRCA 1, a gene responsible for inherited breast cancer (now the subject of the film “Decoding Annie Parker”, which recently debuted here at the Seattle International Film Festival). Building on her successes in breast cancer, King extended her studies to collaborate with Karen Avraham to identify the genetic causes of inherited deafness in Palestinian families. Their work led to a jointly authored paper in Science in 1998, just as Karen Avraham was starting her own lab in Tel Aviv, providing an enormous boost to Avraham’s career and research. The partnership has continued since then, flowering into what Avraham calls “the most remarkable, productive collaboration I could imagine.”

It was while working with Prof. Moien Kanaan, a Palestinian researcher at Bethlehem University also studying deafness, that Karen Avraham introduced Kanaan and King. It was a meeting of minds, and Kanaan won a grant that enabled him to travel to Seattle to join the King lab for a time. The trio won two NIH (National Institute of Health) grants together, spanning 11 years. Then Avraham and Kanaan partnered to win an NIH grant of their own in 2011 – the only time that a Palestinian scientist and an Israeli scientist have been jointly awarded an NIH grant. Indeed, only 1% of grant applications from scientists from outside of the U.S. receive funding. The NIH grants funds to scientists outside of the U.S. only when those researchers have a unique capacity or population to be studied.

The West Bank offers human geneticists this rare opportunity. The region’s common practice of marriage between close family members has resulted in many families with congenital deafness, as much as 10% of the population in some villages, according to Avraham. Driven by this concern, the researchers have pressed for faster ways to accomplish the enormous burden of work involved in genome sequencing, the process of analyzing the order of components in a DNA molecule. “We already know of a significant number of genes that cause hearing loss,” said Avraham, “but using classical methods of sequencing are very expensive.”

In order to identify genetic mutations leading to inherited hearing loss, the Avraham and King labs developed an approach based on targeted capture and multiplexed genomic sequencing. Along with the Kanaan lab, they targeted 284 genes that cause deafness. Sequencing DNA from blood from family members demonstrated that in this family from the Middle East, congenital hearing loss was caused by a mutation in the cadherin gene CDH23. (A) The pedigree of the family, which indicates that inheritance of hearing loss is most likely recessive. (B) A pure-tone audiogram from a family member with severe to profound hearing loss. (C) The mutation in genomic DNA. (D) In the normal cadherin protein, the amino acid valine at position 2635 is buried in the protein core. The mutant protein has phenylalanine (F) at this site. The mutation appears to cause a significant change from a hydrophobic amino acid of medium size to an aromatic, rigid and much larger amino acid. (E) Cadherin 23 (Cdh23), along with protocadherin 15 (Pcdh15), is ex-
pressed in the tip links of the stereocilia, in a region of the hair cells crucial for mechanotransduction.


With the goal of identifying the genes involved in hereditary hearing loss in the West Bank families, the labs of Avraham and King created a pool of 284 genetic sequences that are known to cause deafness in humans and in mice. (The similarities in hearing mechanism between mice and humans make mice tremendously valuable to researching hearing in humans.)

Using high speed next generation sequencing, DNA from each patient with unexplained hearing loss is compared to this panel to determine whether or not the patient has a mutation on any of the genes known to be involved in inherited deafness. King was clear about the significance of this advance. Until about two years ago, the technology only allowed what she calls “an intelligent clinical guess.” Already, the innovation has given families and physicians the answers they seek. In about a third of cases of inherited deafness, says Avraham, the genetic mutation causing inherited deafness can be found. Furthermore, at less than $500 per person, the new technology is cost-effective. Both women are emphatic that knowing why a child has a hearing loss will become. You can determine whether the child is a candidate for a cochlear implant. You can learn whether there might be other abnormalities that might come up – such as Usher syndrome, which also causes blindness. It’s also beginning to be used to suggest therapy,” says Avraham.

King quickly picked up that thread. “I think the Bloedel is uniquely poised to take this information and move to the next step – to develop therapies that do two things: exploit what is learned about pathways for normal hearing on the basis of all this genetic information, and determine which children with which genetic lesions respond best to those approaches.”

Their research, she emphasized, does not happen in a vacuum. There is collaboration with clinicians to exchange information about the efficacy of therapies. She deeply appreciates the supportive research climate on campus. “This [the University of Washington] is really the finest place in the world both to develop the technology for next-generation sequencing, to operationalize it, and then to apply it immediately to problems of patient care. It’s why I came here; it’s why the Genome Sciences department flourishes here. “It’s just heaven to work here in this area.” She credits the visionary leadership of Dean Paul Ramsey and the generosity of the Gates family for creating the powerhouse that is UW’s department of Genome Sciences.

Collaboration with international research partners has always been an important part of research, King said. In the past, she related, the U.S. was a training ground for young scientists from all over the world. While this continues, it has progressed to being more of an equal exchange, as scientists trained here have taken their knowledge back home, trained others, advanced research from afar, and contributed substantially to their fields. “The American public has benefitted enormously from that,” she added.

For Karen Avraham, the Israeli partner, collaboration has offered special challenges. One of her former graduate students, Palestinian researcher Hashem Shahin, suffered a 2-year lapse in his studies at the University of Tel Aviv when the intifada of 2000 prevented him from returning to Israel after a vacation in Palestine. But late in 2002, Shahin’s travel permit came through and he was able to return to complete his Ph.D. He is now a faculty member at Bethlehem University.

Avraham has become adept at working through the bureaucracy,
successfully bringing several scientific partners from the strife-ridden regions surrounding Israel to participate in research at the Tel Aviv University.

Through the years, the research partners have found ways to take advantage of the geographical distance that separates them, passing results of the day’s work between Seattle and Tel Aviv to achieve 24-hour coverage. Periods of intense collaboration in real time happen during sabbaticals and summers spent at each other’s labs.

Ironically, King as an American travels with less restriction among the Arab states, Israel and Palestine than do the nationals of those respective areas. She visits at least once a year to continue her research with colleagues in the Middle East, who are also able to travel from their separate, travel-restricted homes to meet at her lab in Seattle to work together. Collaboration extends also to other Seattle researchers, not only at the University of Washington, but also at nearby clinical institutions such as the Seattle Cancer Care Alliance and the Fred Hutchinson Cancer Research Center.

Could the cooperation of scientists from so many diverse nations influence relations between those countries? Avraham concedes that eventually, scientific partnerships may help to pave the way for peace. ”It doesn’t influence the political arena, unfortunately,” said Avraham. “But it certainly influences people, and at the end of the day, we hope it will filter to the political agenda.” King agrees. ”I think science is an ideal tool for this purpose because we share goals. We enter the collaboration with a common purpose. We decide on the common purpose democratically. And we share out the work to pursue it. And - nothing else matters. Once you come to trust someone working over a long period of time on a very difficult problem, you can move on to discussing things that are more challenging, but you’re doing it in the context of an already established trust. World peace is the icing on the cake.”

Their collaboration with Drs. Kanaan and Shahin has extended to research in other diseases and with other researchers, including the formation of the conference on Mediterranean Medical Genetics in Ankara in 2009. Human geneticists from around the Mediterranean met to share knowledge about how various health problems can be approached with genomic tools, using King and Avraham’s hearing loss collaboration as a model. Avraham related that many of the countries involved share knowledge and equipment to optimize resources and most importantly, provide to patients and physicians the information they need to deal with inherited diseases.

King and Avraham are committed to the quest for the long term. ”For each new gene that’s discovered or even a new mutation in a known gene, we still have the responsibility to find out why that mutation causes deafness,” said Avraham. “There’s an enormous amount of biological information that we must learn if we are to create therapies for these children.” With a multitude of pathways and mechanisms for deafness to occur, the work to conquer inherited hearing loss extends far into the future.

“We are always at the edge of discovery,” said Avraham.
Dr. Edwin Rubel is the scientist whose discovery of hair cell regeneration inspired Prentice Bloedel to endow a center for hearing research in honor of his wife, Virginia, a vivacious woman who began to lose her hearing late in life. Rubel was the first director of the Center and continues to run a thriving lab there. French scientist Dr. Remy Pujol, Rubel’s longtime collaborator and friend, carries on his side of the collaboration from across the Atlantic. Together, they chatted with me about their rich careers in the hearing research world, their ongoing research, the power of collaboration, and about friendship.

“So – when did the collaboration start?” I asked by way of beginning the interview with Drs. Edwin Rubel and Remy Pujol.

“Well,” answered Edwin Rubel, “Let’s talk first about when the collaboration didn’t start – because we both remember that!” The two friends – and their friendship is evident – laughed together, remembering.

The year was 1972, and both scientists were assistant professors at Yale University. Although Remy Pujol and Edwin Rubel had never met, Rubel had quoted Pujol’s studies about the central nervous system in his dissertation. “But,” continued Rubel, “he didn’t think it was worth going across the street to meet me!” Both laughed again as Pujol rejoined “You didn’t either!” Such was the state of 70’s pre-internet communication that neither knew that the other was working just across the street.

When the two men finally met in person at a scientific meeting two years later, Pujol invited Rubel to Marseilles. Rubel didn’t make that trip, but their scientific interests were steadily drawing closer together. Four years after that first missed opportunity at Yale, Rubel went to France to visit the man whose research had intrigued him. By this time, Pujol and his lab had moved to the University of Montpelier. “What really brought us together really is that we are intensely interested in [cell] development – the cerebral cortex, the brain, and inner ear, and the brainstem,” Rubel mused. “We were some of the few people in the world who were working on development of the auditory system both functionally and structurally at that time. We both had our own techniques, but they were complementary,” he added.

“What’s really funny is that now, we are also merging in our interest in protection,” added Pujol. “…At the way to understand the mechanism by which the inner ear is getting damaged by noise, drugs, etc., and how to protect it.”

“We’ve always influenced each other,” said Rubel. “It’s an ongoing collaboration, whether we’re in the same building or the same country.” He went on to say that their shared interest in how cells (continued in the next page)
“Edwin probably is the most expert person in the world on the auditory system,” said Pujol. “He can discuss anything about it because he has [such a broad] background.” As their professional collaboration has deepened over the years, so has their friendship.

Rubel thought for a moment. “Put it this way,” he said. “When Remy officially retired from the French academic system, there was no question in either my wife’s mind or mine that we had to be there for his celebration. And I know that when and if I have a retirement party here, he’ll be here. We’re more like brothers.”

“If you retire in time,” Pujol interjected.

“Our bond is a bond shared out of mutual respect,” Rubel said. “When I see Remy with students, post-docs, and staff, I take enormous joy. Papers are actually a minor thing, really. The intellectual collaboration is worth way more than that. It’s intangible, but so important.”

I asked if distance affects the collaboration. Rubel didn’t hesitate: “I don’t think so! Especially now – we email at least every month, [and keep our conversations going]. It helps to have another person in the same generation who has this understanding of the biology of the cochlea.”

Their careers have followed similar trajectories. Both men, Rubel pointed out, have built major centers and have had to hand off the running of those institutions. French law is very strict about retirement age, and Pujol had to stand aside for a new generation. He continues to do research, though “I’m learning how to retire gracefully from Remy,” added Rubel. “We’ve always tried to help each other.”

What gets them excited about the future? A great deal, it turns out.

“Protection!” Pujol immediately responded. “Many people are affected by deafness and tinnitus. There’s nothing on the table right now to slow down deafness and tinnitus – there’s nothing pharmacologically – and I think we are getting close to an era where a new way to treat deafness will come.

Rubel was nodding emphasis. “I agree. I think we are truly at a crossroads in terms of how we will deal with hearing loss and how we will deal with hearing loss as a society in the future... To develop ways to prevent, delay, and cure hearing loss. That is – it’s gonna happen. Twenty years ago, we would never have said that, but we can see light at the end of the tunnel now.” Tools and technology are changing everything, he added. “Now we can develop a molecule in 6, 8, or 10 months so that it’s two orders of magnitude more potent in preventing hair cell death. That’s just amazing!”

He elaborated on his prescription for accelerating the process: supporting a variety of approaches by diverse teams, and providing adequate funding. “We’re truly at a threshold for changing how we deal with...
hair cell loss," Rubel insisted. “It’s a matter of getting enough people working on this and being open to every reasonable idea. It’s time to get more people working on this and fund it adequately... We’ve never had a time like this where we could see how the world was going to be very, very different in the future.”

Rubel refers to progress in the field of genetics as a true revolution. “How we can look at the dynamic expression of genes and their gene products in every different kind of situation isn’t going to just affect genetics studies; it’s going to affect all kinds of studies,” he said.

Pujol and Rubel agree that progress in their field during their careers has been unprecedented.

“When we met in 1973 or 74 we couldn’t even imagine the tools we’d have. They just didn’t exist; there was nothing like it! Or the advances that have been made - hair cell regeneration as a field didn’t exist. Really protecting cells – we didn’t know anything about why those cells died; we just knew that they died. Other fields [were so much farther along] like heart and lung disease, which was going strong – they were already working on cures. We were just describing the phenomena but now we have incredible tools.”

He points to the INSERM (Institut National de la Sante et de la Recherche Medicale - National Institute of Health and Medical Research) model in France, where his friend Pujol was able to assemble and maintain a successful team to study hair cell regeneration. American universities, he asserts, are not as supportive of the team approach, often rewarding individuals rather than teams. “What we’ve tried to build here [at the Bloedel Center] are teams that work together,” he said. “Only when you get something like the Bloedel – it becomes like a marriage, where the marriage is the important thing. We’ve tried to build teams that work together. We need each other.” The two friends are in strong agreement that collaboration between teams, between institutions, and across international boundaries is irreplaceable.

Remy Pujol nodded. “Ed is coming along now. He’s really getting the idea about communications.”

Edwin Rubel grinned. “It’s a great thing,” he said. And with that, the two colleagues returned to their labs.
The Center’s missions are the discovery of new fundamental knowledge about hearing and balance and disorders of hearing and balance, and the application of these findings toward improved diagnostic methods and therapies.

The Center envisions the University of Washington as a premiere institution in the quest to conquer deafness and disequilibrium by prevention and by restoring hearing and balance through repair and regeneration. This vision is based partly on past performance, work in progress, and long range planning for research in the molecular and genetic mechanisms that control the development, function, and regeneration of the audiovestibular systems. Our vision also encompasses the development and optimization of technologies that currently help those with hearing and balance disorders.

The Center values the innovative pursuit of knowledge, rigorous scientific integrity, and classical scholarship in a collegial environment characterized by teamwork, information sharing, and mutual respect.

The Center’s mission is carried out through multi-disciplinary fundamental and clinical research, research training, information dissemination to the professions, and public education.

To learn more about how to make a tax-deductible contribution to the Center, contact Colin Ware, UW Medicine Advancement at 206-685-5412,