

The Millennium Decade Memories of 2000-2009

Wolfgang Faig, Professor Emeritus in Geodesy and Geomatics Engineering and Dean Emeritus

www.unb.ca/faculty/emeritus/honorees/fredericton/

As both a faculty member in the department of geodesy and geomatics engineering and an administrator, **Wolfgang Faig** has distinguished himself with an indefatigable appetite for teaching and research on the one hand and service to the university and the community on the other.

Encouraged to work with his esteemed fellow countryman, **Gottfried Konecny**, who was establishing a department of surveying engineering at UNB, Dr. **Faig** arrived here in 1963 as a master's student. He returned to his native Germany to complete his doctoral work, and in 1971 accepted an appointment to the UNB faculty of engineering. In the ensuing 28 years, Dr. **Faig** became an integral part of the UNB community.

Never one to shy away from responsibility, he served in several administrative roles while at the same time developing an active research program and assuming a full teaching load. Even after being appointed dean of engineering in 1990 he continued to teach and maintain a research grant from the Natural Sciences and Engineering Research Council (NSERC), no mean feat in a period of growing competition in the field of geomatics.

Recognized as a worldwide authority in close-range photogrammetry, a critical component of mapping, he has been among those who have solidified UNB's world-class reputation in geomatics engineering. Much sought after by graduate students, Dr. **Faig** supervised 37 graduate students during his career and read and critiqued the theses of some 60 others. During his career, he travelled the globe to share his knowledge and expertise with colleagues and practitioners. As dean of engineering for nine years, he provided leadership to a faculty that is both diverse and demanding.

(Harper's Studio photo)



2000. Prof. and Dean Emeritus **Wolfgang Faig**

(Harper's Studio photo)



2000. Dr. **Marcelo Santos** joins GGE

(Harper's Studio photo)



2000. Dr. **John Hughes Clarke** from 'Stool' to Chair of Ocean Mapping

Ratings Benchmark UNB Research and Also Demonstrate Accountability

UNB Perspectives, 31 January 2000

Like filing tax returns, research rankings at UNB come every year. And like tax returns, they tally up what everyone brought in during the previous year. The purpose, however, isn't to determine a refund or amount owed. "It's accountability and a national benchmark," says **John McLaughlin**, vice-president (research and international co-operation). "We are the graduate studies and research centre for the province, and we need a measure of self-awareness of our programs," he explains. "It's very important that we're accountable, and our research rankings process is a solid indication we're doing that. At the national level, we need to know how we rate in comparison to the rest of the country."

Dr. **McLaughlin** chairs the committee of deans from both campuses that reviews all submissions and assigns the rankings, based on research productivity publication record, number of graduate students, levels of funding, participation in research projects, and other criteria. "Different academic disciplines have different ways of evaluating—so it's not one template for all," he says.

A department with a rank of one is the best. "It is a ranking of national and international stature," Dr. **McLaughlin** points out. "Effectively, 100 per cent of faculty is engaged in research." A rank of 10 indicates no departmental research at all.

For the ranking, 1998–99, four departments attained a research ranking of one: chemical engineering, chemistry, history, and geodesy and geomatics. The latter has taken the exercise very seriously from the start 25 years ago. "The department of geodesy and geomatics appreciates the importance of having a No. 1 ranking, which it has had since Year 1."

Update: The most recent exercise that covered 2007–2009 introduced a new rating system. Only one department on the Fredericton campus and one on the Saint John campus would be ranked 1* as the top department on each campus. GGE was ranked 1* on the Fredericton campus.



(Harper's Studio photo)

2000. Dr. **Yun Zhang** joins GGE



(Harper's Studio photo)

2000. Dr. **David Wells** goes south

Pretending to be retired, **Dave** begins a new part-time professorial career at the Dept. of Marine Science, Univ. of Southern Mississippi, in addition to continuing to teach the "wet" side of surveying part-time with GGE. Oh, and he occasionally drops in at **Larry Mayer's** Centre for Coastal and Ocean Mapping at the Univ. of New Hampshire.

**Petr Vaníček, Professor Emeritus in
Geodesy and Geomatics Engineering 2001**

www.unb.ca/faculty/emeritus/honorees/fredericton/

Dr. **Petr Vaníček** is recognized internationally for his technical contributions to geodesy. A professor of geodesy at UNB from 1971 until his retirement in 1999, Dr. **Vaníček**'s achievements were numerous. He supervised or co-supervised over 70 graduate students working toward their master's or PhD degrees. He also has an impressive research record, having either directly or indirectly attracted more than \$2 million in research funding to the university.

Over the past 25 years, Dr. **Vaníček** worked closely with universities in the Middle East, Eastern Europe, Scandinavia, and Australia. He has acted as an external reader of theses and graduate reports prepared by 10 graduate students at other universities. All those who benefited from his tutelage would no doubt testify to his ability to instil clear thinking, originality, and a hard-work ethic.

An author or co-author of more than 300 publications, Dr. **Vaníček** was awarded the J. Tuzo Wilson Medal for outstanding contributions to Canadian geophysics. The medal, awarded by the Canadian Geophysical Union, is the highest award an individual can receive in the field of geophysics in Canada. Dr. **Vaníček**'s textbook, *Geodesy: The Concepts*, has been translated into several languages. It is the standard text for both undergraduate and graduate courses in geodesy worldwide.

Seeking Secrets Below the Sea

Michelle Porter, The New Brunswick Reader, 5 May 2001

Dr. **John Hughes Clarke**, flushing only slightly with excitement, explains the secret. It can map uncharted territories: the St. John River, the Bay of Fundy, and waters off Hawaii. It can pinpoint dumped cars, ancient shipwrecks, fishing weirs, and underwater dumpsites. It can tell a fisherman



(Harper's Studio photo)

2000. Dr. **Peter Dare** joins GGE



2000. A winter visit by **Daniel Stuedler** (M.Sc.E. 1991)

where the scallops are. And, it could clear up the debate regarding how much salmon aquaculture a bay can hold.

That's a lot to put on the shoulders of a little piece of equipment called a multi-beam sonar. **Hughes Clarke** created the software that works with the multi-beam sonar to create kaleidoscope images of our ocean floor. It's in demand, too. The whole world is switching to multi-beam sonar technology and asking for **Hughes Clarke's** software and the expertise of New Brunswickers, who test and calibrate new multi-beams bought by the Royal Australian Navy and the Royal New Zealand Navy. "Both countries turned to UNB to do testing of equipment," **Hughes Clarke** said. The rest of the world is so excited that **Hughes Clarke** does more work outside the country in which he developed the software, than in it. Most of the work enabling **Hughes Clarke** to make use of the technology is contracted by foreign governments.

It was Clearwater Fine Foods, Nova Scotia's biggest seafood company, who started it all. The multi-beam sonar business was just small potatoes until they saw a money-saving application. Why not use multi-beam sonar technology to find the places scallop live and feed? So, they partnered with the Canadian Hydrographic Service (CHS) and mapped Browns Banks, off Nova Scotia. The result was a much more cost effective and environmentally friendly fishing practice. "They found that if they could see what was on the bottom, they could catch scallop in a quarter of the time," **Hughes Clarke** said. "They used to drag around blindly, tearing up whatever was there on the sea floor, hoping to find what they were looking for. Now, they've bought their own multi-beam sonar, have mapped most of George's Bank, and they drag only areas of the sea floor that actually have the scallop they're searching for. They make more profits, more efficient use of their time, and do less damage, all in one shot. It turns out that 10 percent of the seabed is where 90 percent of the fish congregate. We started off making charts so ships don't run aground. Now it's really exploded." And the world is catching on.

Hughes Clarke likes to look where he's not supposed to: beneath foaming waves to the ocean floor and even river floors where stripped



(David Wells photo)

Left are UNB President Liz Parr-Johnston, N.B. Premier Bernard Lord, and **Petr** looking thrilled.



(Wendy Wells photo)

2001. The 5 Daves: **Carney, Coleman, Monahan, Fraser, Wells**

2001. Dr. **Petr Vaníček** receives Professor Emeritus honour

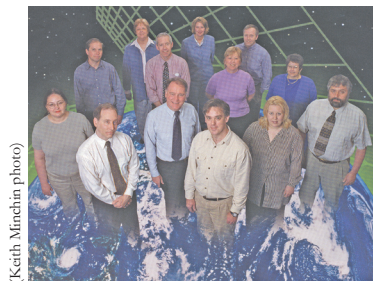
cars, rusting shipwrecks, waste disposal sites, and sunken logs culled decades ago and worth thousands of dollars each, lie almost unnoticed. With a grin he retells a local legend, explaining how so many car wrecks ended up in the middle of the Kennebecasis River. “It’s been said there was an ‘arrangement’ with the local ferry driver at some point,” he said. The arrangement, so the locals say, enabled car thieves to get rid of the evidence—the car body, completely stripped of anything valuable. Imagine it: a clandestine meeting with money changing hands; the loading of the stripped car onto the back ramp of the ferry; the ramp would drop halfway across the river, and the car would be gone. “Local people know a lot of the unofficial history,” he said.

There are ways to get a peek at the ocean floor without using multi-beam sonar technology. But it is like attempting to describe the picture in a puzzle by looking at only a few unconnected pieces. The CHS and UNB took a leap by taking on and developing what was an unstable and unworkable technology at the time. They saw it as a critical technology that could drastically improve the reliability of their major product—nautical charts that aid safe navigation—but needed a lot more development before it was really viable. “They were visionary,” said **Hughes Clarke**. “If it hadn’t taken off, we’d call them fools now. But CHS saw the need, and Canadian companies built the instruments.”

Multi-beam echo-sounding is a technique that employs ship-mounted sonar equipment to produce detailed two- and three-dimensional models of the ocean floor that allow a much larger portion of the ocean floor to be mapped at once. A properly designed multi-beam will cover a swath that is between three and seven times the water depth. An acoustic picture of the sea floor is created by measuring the sound energy bounced back from the bottom. Harder materials send back more energy than softer ones.

But none of this could be done without the software, developed by **Hughes Clarke**, which interprets the information the multi-beam sonar generates, and turns it into maps. These maps are 3-D computer images that you can actually ‘fly’ through, as though you were underwater moving across the ocean floor. With these, **Hughes Clarke** can see the distribution

Front: Lorna Brown, Kevin Hibbert, **Dave Coleman**, **Rob Lunn** (M.Eng. 2007), Susan Logan, **Wayne Walsh** (B.Sc.E. (Surveying) 1986). Back: **Jody Blakely** (B.Sc.E. (Geomatics) 1997), **Wendy Wells**, **David Finley** (M.Eng. 1997), Heather MacLean, Betsy Coleman, **Stephen Hartley** (B.Sc.E. (Surveying) 1981), unknown.



2001. Digital Earth organizing committee

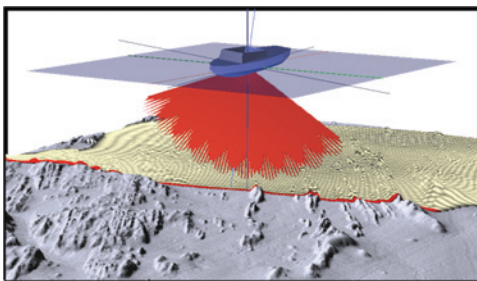
of materials as well as man-made objects as small as an engine, depending on the depth of the water. As a result, **Hughes Clarke's** software is now the most sold multi-beam software in the world. Canadian motion sensors and moving vessel profilers are used on ships all over the world. Because **Hughes Clarke** has dedicated years to fine-tuning the software that interprets multi-beam information, his software is the fastest of its type—the reason behind it being called into service at barely a moment's notice.

GGE Celebrates 40 Years of Success

GGE Website June 2001

Check out the GGE website for 2001 and see many, many more pictures.

Talk about a turnout!! The terrific amount of work put in by all GGE faculty and staff, and in particular by **Debbie Smith**, **Kim Delorey**, and **Linda O'Brien**, culminated in a very successful June 22–23 celebration of the fortieth year of the Department. Former students, faculty, and staff arrived from far and wide to meet and greet each other in the corridors of Head Hall. The **Kenneth Cliffords** (B.Sc.E.(Surveying) 1974) came from Texas (2953 km); **George Eaton** (B.Sc.E.(Surveying) 1980) and **Stuart MacRitchie** (M.Sc.E. 1977) joined us from British Columbia (4201 km); **Ho Koon Kan** (B.Sc.E.(Surveying) 1985) travelled all the way from Malaysia (14,214 km); the **Robin McLaren** (M.Sc.E. 1978) tripped in from Scotland (4427 km); **Frank Neidhart** (M.Eng. 1999) arrived from Germany, **Stewart Walker** (M.Sc.E. 1975) flew in from California (4511 km); **Yong Tech Nyek** (B.Sc.E. 1986) and his wife made the long journey from Brunei (14,376 km), and **Gerard Mtalo** (M.Sc.E. 1991; Ph.D. 1996) journeyed from Tanzania (11,780 km). Who travelled the farthest? Well, **Robin McLaren** travelled through 10 degrees of latitude; but **Gerard Mtalo** covered 57 degrees of latitude. **George Eaton** flew through 57 degrees of longitude; whereas **Ho Koon Kan** covered a phenomenal 193 degrees and **Yong Tech Nyek** traversed an impressive 179 degrees of longitude. I'd say that in both degrees and kilometres, **Gerard Mtalo**, **Ho Koon Kan**, and **Yong Tech Nyek** win the distance contest.



2001. Artist's conception of multibeam sonar in operation (OMG graphic)



(Peter Shih photo)

2001–2002. **Dave Carney**, Executive-in-Residence

As can be seen from the many photos attached to this story on our web site, the two-day event was a success. As we head into our 5th decade, we can only hope that our future graduates are as enthusiastic about maintaining ties to the Department as have those who paused here for 4 or 5 years on their road through life.

Welcome to **Dave Carney** 2001

David T. Carney (M.Sc.E. 1978), joined GGE in early September 2001 as our first Executive in Residence. Mr. **Carney**, of Geomatics Canada, Natural Resources Canada, under the terms of the Public Service Commission of Canada's Interchange Canada program, will be with us for a year. Some of his contributions will involve GGE's strategic growth and outreach efforts to increase the number and quality of both the undergraduate and graduate students. **Dave** will be assisting GGE faculty in developing new strategic relationships or enhancing existing ones with other UNB departments and other institutions in Canada and overseas. He will be helping GGE faculty to identify, assess, and pursue new externally-funded international research and training possibilities. He also will be helping us to re-establish a program advisory committee, to develop proposals for research chairs, and to propose a sustainable, internal student recruiting program.

Mr. **Carney** brings to the University a wealth of experience in organizing, instituting, and managing programs and services. For instance, most recently he was with the Canadian Hydrographic Service leading a major study to redesign the organization, structure, and delivery of the national hydrographic program. Previous to this he was Director General of Policy and Planning with NRCan (for Geomatics Canada and the Geological Survey of Canada), providing management services for a multi-million dollar budget and 1600 employees. He has also managed the national topographic mapping program, the National Atlas of Canada, the aeronautical charting program for Canada, and the federal GIS Division.



2001. 40th Anniversary celebrations
(Gerhard Gloss photo)

Left: **Sunil Bisnath** (Ph.D. 2004), **Tomas Beran** (Ph.D. 2008), **Mike Pinch** (B.Sc.E.(Surveying) 1966, John Holmlund (generous department supporter and 2002 Advisory Board member), **Erik Holmlund** (M.Eng. 2001).



(Gerhard Gloss photo)

2001. Dr. **Anna Szostak-Chrzanowski**, Sr. Research Assoc., Adjunct Prof.

Dave has won a number of awards, ranging from the Governor General of Canada's Medal for contributions to Canada and Canadians, the Gold Medal from the International Cartographic Association, and a U.S. Presidential Citation for geographic support to the Gulf War. He has chaired such gatherings as the federal-provincial Canadian Council on Geomatics, the federal interdepartmental Inter-Agency Committee for Geomatics (GeoConnections), the NATO Geographic Standards Committee, the National Working Group on Excellence in Geomatics, and the Geomatics Canada Revolving Fund Committee.

The Map Makers: UNB has Made Fredericton a Hub of Geomatics Expertise

Kathryn Harley, Atlantic Progress, September 2001

This past June, delegates and speakers from more than 30 countries made their way to Fredericton, for the second International Symposium on Digital Earth. It was impressive that it was such an international group; impressive, too, that it was held in Fredericton—the previous conference two years before had been in Beijing. Finally, the event was impressive because the 500-plus people were all gathering in Atlantic Canada to talk about the science, commercial applications, and social impact of something most of us have never heard of before: geomatics.

If you scrutinize Fredericton closely, it's easy to see why the city was an appropriate site for the Digital Earth conference. Thanks to the GGE department at UNB, the city has witnessed several companies take advantage of the strategic importance of geomatics in everything from resources to real estate.

Dr. **David Coleman**, who chairs UNB's department of GGE, defines geomatics as "everything from surveying to mapping, through high technological positioning in land, water, and outer space." Until 1994, the department was simply called surveying engineering," says Coleman, "people used to get this picture of a guy with a transit in a ditch surrounded by mosquitoes." Today's geomatics engineers work in such areas as satellite-



(Gerhard Gloss photo)



(Marg Langley photo)

2001, **Derrick Peyton** (B.Sc.E.(Surveying) 1982; M.Sc.E. 1990), **George Eaton** (B.Sc.E.(Surveying) 1980)

based positioning and navigation (GPS), industrial metrology, and remote sensing systems, as well as in the more traditional area of land surveying.

Although many people may not be familiar with the term geomatics, few have not felt its effect. Geomatics is at work in everything from the data bases that support emergency 911 services to land registries to policing; for example, car thieves are finding it harder to make a getaway these days, what with GPS tracking their vehicle's location. A good example of the road safety factor is Cadillac's OnStar network. As well as helping the driver navigate, it also automatically alerts emergency services if the air bags deploy. With GPS technology merging with Palm Pilots and cell phones, pretty soon none of us should ever get lost.

John McLaughlin Ready, Set to Start as UNB's Next President July 1 *UNB Perspectives, 11 March 2002.*

“Great things are happening and even better things will be happening,” says Dr. **John McLaughlin**, who is ready to take office as UNB's 17th president and vice-chancellor on 1 July. The president-designate's optimism for the future was reinforced with the outpourings of public support he received as news of his selection spread. “I was overwhelmed by the hundreds and hundreds of messages I received. It is quite amazing to see just how deeply people from all walks of life care about UNB and want to contribute to strengthening its future.”

Dr. **McLaughlin** will start work on strengthening the future by developing a shared vision of what stakeholders want the university to be. He will hold extensive meetings with members of the UNB community—and continue them throughout his term. “I really want open vigorous debate, discussion,” he says. “I will be setting up a process for meeting with faculty, staff, and students regularly on both campuses.”

Dr. **McLaughlin** sees the Senates, faculty councils, advisory boards, and inter-faculty forums all playing bigger roles in debating and defining UNB's future. Initially, though, meetings with stakeholders will serve to instruct

2001. 40th Anniversary celebrations
(left and right photos).

Near left: **Adam Chranowski**,
Eugene Derenyi, **Willis Roberts**,
Angus Hamilton, **Gerhard Gloss**,
Petr Vaníček, **Ira Beattie**, **Sam Masry**, **David Wells**, **Gottfried Konecny**



2001. Presentation to **Sam Masry** of a poster showing the evolution of CARIS compiled by **Y. C. Lee**, who played such an integral part in its development

him: “I have a lot to learn and I’ll be soliciting advice and counsel from everybody.”

The biggest external challenge Dr. **McLaughlin** has identified is helping the community at large recognize the importance of postsecondary education to its future. “The university has a key role to play in advancing the province’s social and economic agendas. There’s tremendous support out there. We’ve got to mobilize it.”

Dr. **McLaughlin** is looking at a three-year agenda to accomplish five major objectives. These include enhancing the quality of teaching and learning and further developing the student recruitment and marketing program. As well, he wants to strengthen the university’s research base and develop new relationships with the province regarding funding. He will also take to the wider stage to develop further the university’s web of relationships with the broader community. “We’re a great institution, but we can do even more in enhancing our teaching and learning, research and partnerships.”

State of the Art GPS Guidance Software Developed at GGE

News@UNB, 12 August 2002

The seaports of the world present a huge challenge to those who work there. Shipping containers, 20-to-40 feet in length, have to be stacked within inches of each other, and the slightest mistake could result in thousands of dollars in damage.

Two researchers at GGE have developed guidance software to simplify this enormous task. Drs. **Donghyun Kim** and **Richard Langley**, contracted by Seoho Electric Company Ltd. of Korea, have created a guidance system to steer giant port cranes using GPS. Standard mechanisms currently used to guide port cranes are cameras mounted on the sides of the cranes. The cameras rely on lines painted on the ground to keep the crane from running into stationary containers. “The problem with painted lines is that they have to be perfectly maintained,” explains Dr. **Kim**. “Worn paint, rain, ice, snow—any of these things can hamper the ability of the guidance system.



2002. Dr. **McLaughlin**’s
Inauguration (Joy Cummings photo)

Chancellor Fredrik
Eaton; Roy MacLaren;
Dr. **McLaughlin**;
Lieutenant-Governor
of N.B. Marilyn
Trenholme Counsell;
Donald Savoie; Vice-
President (SJ) Thomas
Condon.



(Joy Cummings photo)

2002–2009. Dr. **John D. McLaughlin**,
President and Vice Chancellor

The nice thing about this new software is that it does not rely on actual painted lines. It digitally maps the port and uses GPS to control the crane's actions.”

The new system uses a GPS base station located at the port and a pair of GPS receivers on the crane. The software can then determine the crane's location using the base and crane receivers and the GPS satellites. Its accuracy is within a few centimetres. “It's not the only GPS-based guidance system, but it might be the best one,” says Dr. Langley. The new technology was almost exclusively developed by Kim, but he did receive help from Langley and some of his department's graduate students. The software was written and tested over the past year with field-testing completed this spring.

The field-testing site was one of the container ports located in Kwangyang, Korea. Dr. Kim traveled there with graduate student Sunil Bisnath (Ph.D. 2004) and conducted tests in May. While testing was scheduled to take two weeks, the researchers encountered problems and ended up taking more than a month. “Everything went well in the lab, but it is easier there than in the real world. It's not until you get out in the field that you find all the problems,” explains Dr. Langley. Even though the field-testing seemed like a daunting task, Kim never strayed from the project. “The guidance system was constantly challenging me to get it right,” says Dr. Kim.

This auto-steering system will improve productivity and safety at busy container ports. The guided crane has a horizontal accuracy of 1.5 cm. The first auto-steering system has been installed at a major container port in South Korea.

Seoho is now marketing the new guidance system and UNB welcomes interest in new applications for the technology. Drs. Kim and Langley are already researching the next generation of GPS-based guidance systems. Future systems could include the ability to send GPS data through the Internet, which would allow GPS base stations and remote receivers to operate at any distance. As Dr. Langley points out, “Technology marches ahead and we want to be in the lead.”



2002. Dr. Peter Dare,
Chair of GGE



2002. GPS guided cranes
in Kwangyang, Korea



2002. CSL Heron