

LEADERS IN INNOVATION

*Profiles in Research*

Athabasca University 



Athabasca University is Canada's largest online and distance education university. Founded in 1970, Athabasca University offers hundreds of credit courses, undergraduate and graduate degrees, and other university credentials. Courses are offered through Individualized Study (online and distance learning), and Grouped Study (classroom seminars at collaborating institutions, and e-Class).

The flexibility of online and distance learning allows students to complete courses and full credential programs on a full-time or part-time basis. Students may also complete Athabasca University courses to satisfy the graduation requirements at other universities and colleges.

The University collaborates with partner organizations to increase access to degree completion opportunities.



## MESSAGE FROM THE PRESIDENT

**W**elcome to Athabasca University, where the challenges of the distance learning environment lead to the innovation that is the key to helping us better serve our students. The result is a growing culture of investigation and discovery, not least of all in the area of academic research. Every day, we have the opportunity to apply our findings to the way we serve our students, to what we teach them, to how they learn.

The scope of research at Athabasca University is as diverse as those conducting it. Through Dr. Terry Anderson's mission critical investigations, we will better understand interactions between the elements of learning and those who learn; Dr. Burton Voorhees' inquiry will shed light on the mathematics behind structural stability and flexibility.

This list is not conclusive. Recent NSERC grants mean that two AU faculty members, Drs. Peter Holt and Oscar Lin, can continue investigating learning agents that will allow us to individualize course content to match student learning styles. Our involvement in collaborative efforts such as eduSource Canada will help provide for easy access to e-Learning materials for all Canadian teachers, parents and students.

I invite you to do your own research, and discover why Athabasca University is being recognized at home, and around the world, as Canada's premier distance and on-line university.

Dominique A.M.X. Abrioux, PhD  
President, Athabasca University

*Discovery* exists in seeing what everyone else has seen,  
and thinking what no one else has thought.

*~ Albert Szent-Györgyi, 1937 Nobel Prize in Physiology and Medicine*

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## *Dr. Terry Anderson*

Professor, Distance Education  
Canada Research Chair in Distance Education

**W**ith more than 30 years of experience developing and implementing distance education opportunities, the concept of learning from a distance is nothing new to Athabasca University. However, the concept has only recently gained international attention and Dr. Terry Anderson has been able to contribute to that increased profile. As professor, Distance Education, and Athabasca University's first Canada Research Chair recipient (in Distance Education), he knows about learning, and teaching, from a distance.



Dr. Terry Anderson



*Trey Anderson*

→ When Anderson was younger, he spent 15 years on a farm in northern Alberta and, through that experience, came to learn how costly and inconvenient it was to pursue either formal or informal studies. When the Internet first came along he was “hooked.” His first connections were made on a party line shared with four families and “as you can imagine,” he says, “my neighbours were not too impressed with me holding the line. Thankfully, they had never heard a modem on the line before and so blamed the telephone company, and not me!”



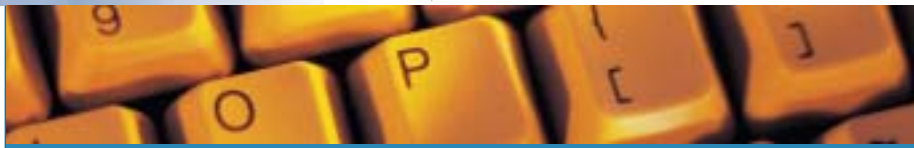
Anderson realized that being a part of the important work creating opportunities for delivering high-quality distance education could become a lifelong goal, and one he has spent his academic career pursuing.

Prior to joining Athabasca University in 2001, he was professor and co-director of Academic Technologies for Learning at the University of Alberta's Faculty of Extension.

His research at Athabasca University focuses on interaction, whether between students and teachers, or students and their peers. A new area of interest for Anderson is the interaction between students and content and content agents. His hope is that Athabasca University will be able to offer education that has customizable amounts of interaction; that students can participate in, and create, learning experiences that meet their own learning needs and those of the community. In short, he's working to maximize access.

He appreciates the environment present at Athabasca University because the subject of his research is so closely related to the University's strategic goals. This has not always been the case for Anderson.

"I'm more used to working on the edges, where distance education is seen as a novelty item and not really what the



institution is all about," he says. "Coming to an institution where my work is situated at the forefront of mission critical research is a great opportunity, if just a bit scary as well."

Anderson has been helping spread the distance education word to a worldwide audience. During the first year of his Canada Research Chair appointment, he was invited to give speeches at distance or adult education conferences in Taiwan, China, Greece, France, Brazil, New York, and across Canada.

As well as being a recognized speaker, Anderson serves on the editorial review boards for numerous peer-reviewed journals relating to distance education and has published widely in the area of distance education and educational technology. Most recently, he co-authored a book entitled *e-Research: Methods, Issues and Strategies*.





Trey Anderson

## RECENT WORK

- Principle investigator with the Telelearning National Centres of Excellence.
- Serves on the Expert Advisory Panel for the Office of Learning Technologies at Athabasca University and is active in provincial, national, and international distance education associations.
- Co-founder of the Campus Alberta Repository of Educational Objects ([www.careo.org](http://www.careo.org)) and currently acts as its Director.
- Instrumental in the development of the CANCOR metadata standards for identifying and retrieving educational objects, and the MERLOT ([www.merlot.org](http://www.merlot.org)) repository, which adds peer reviews and teacher applications to Learning Objects. Currently serves as Co-Director.
- Co-authored *e-Learning in the 21st Century: A Framework for Research and Practice*, published in 2003 by RoutledgeFalmer.
- Co-authored *e-Research: Methods, Strategies and Issues*, published in 2002 by Allyn & Bacon.

## *Dr. Martin Connors*

Associate Professor of Mathematics, Physics, and Astronomy  
Canada Research Chair in Space Science, Instrumentation and Networking

**D**r. Martin Connors knew space held an interest for him when he picked up the book *The Stars* by H.A. Rey (author of the famous *Curious George* books) in grade school. That was his introduction to astronomy. This experience in his early years piqued his interest, but he says it wasn't until about Grade 10 that he realized a career in astronomy was a possibility.

Since that idea took hold, the sky has literally been the limit. He won his London, Ontario high school science fair in 1972 for his observations of variable stars, and followed that win by earning an undergraduate degree in mathematics (which included astronomy courses), followed by both a master's and PhD in physics. He has taught at Athabasca University since 1996. His most recent recognition (2002) as a Canada Research Chair in Space Science, Instrumentation and Networking allows him to continue his research in the measurement of the Northern Lights.



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Dr. Martin Connors

In April of 2002, Connors, along with Kaare Berg and Peter King from the University of Calgary's Institute for Space Research, oversaw the installation of AUGO, lovingly nicknamed 'Wilbur.' The observatory, located atop the roof of Athabasca University's main building, takes colour photographs of auroral activity in the skies above Athabasca and sends the images over an Internet link to the University of Calgary. The images are then analyzed using information about magnetic fields, also recorded at AU.

"The part I like best is still doing the observations," Connors says, "be it in the unreal world of the top of a Hawaiian volcano, or a cold, dark and clear night in Athabasca."



Installing 'Wilbur' were (left to right):  
Kaare Berg and Peter King from the University  
of Calgary's Institute for Space Research and  
Martin Connors from AU.



## The Whirlpool Galaxy

Image was produced by the [Hubble Heritage Team](#) (NASA/STScI/AURA) using data collected by Principal Astronomer N. Scoville (Caltech) and collaborators.

Connors' major research interests include the area of geomagnetism (electric currents associated with aurora) and astronomy (asteroids and impact craters). Studying space weather allows for researchers to assess the effects – mainly negative – of auroral activity on such things as navigation, surveying, pipelines, power grids, and satellites, all of which affect the daily lives of thousands of people.

Athabasca University possesses a number of attributes that facilitate Connors' research. For instance, the University has the unique advantage of having both the most northerly campus location among Canadian universities and a rural setting, so it is well suited to studies of phenomena related to geomagnetism and the northern sky. It also boasts the Athabasca University Geophysical Observatory (AUGO).

It is these observations that enable him to discover new things; things that make him stop and say, "This is so cool!" The 'cool' factor aside, Connors has an end goal for his research.

"We live in a very complicated natural setting," he says. "Questions like 'Why does the aurora happen?' or 'Why do some asteroids come near the Earth and even hit it from time to time?' are pretty simple compared to 'How does my liver work to clean my blood?'"

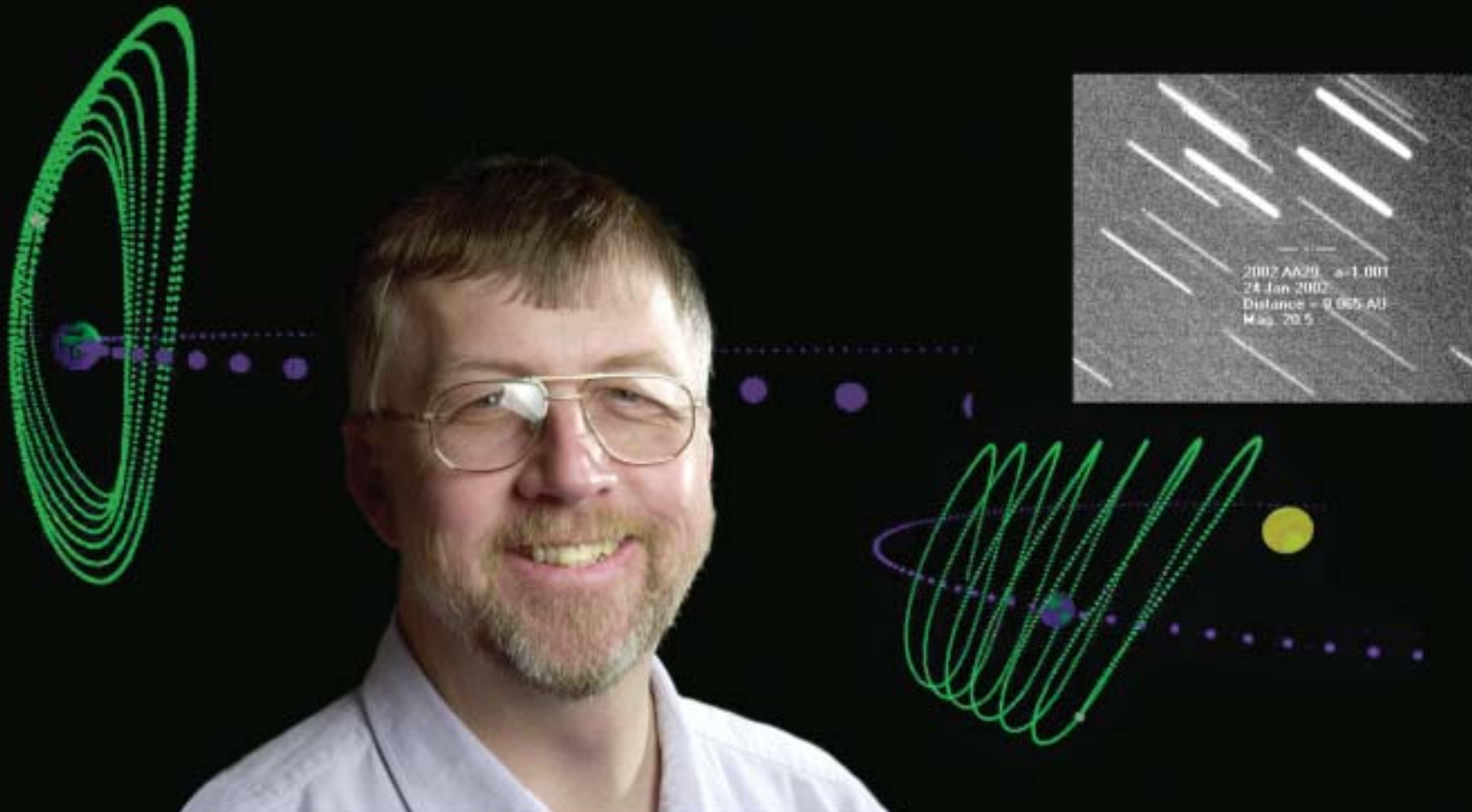
"Yet, we still don't have good answers to the first two questions. I think they are more likely to have solutions sooner than harder questions in biology or sociology. So I want to get to that 'wow, how neat' level with these problems. The general public and students should be impacted since auroras are part

of our daily lives, and the press keeps worrying us with asteroid scares."

"These are things they would like to understand and that level of interest is what is important to our development as a civilized nation with understanding, general understanding that can be applied to products to enhance our lives. And, of course, the knowledge enhances our lives directly, as well."

Although Connors had more lucrative career opportunities before deciding to teach and conduct research, he knew this was the path for him and pursued his dream. "Somewhere I saw a phrase 'do what you love and you will never work another day in your life,'" he says. "That seems true."

Background illustration credit: Paul Wiegert, Queen's University






Image was produced by the [Hubble Heritage Team](#) (NASA/STScI/AURA) using data collected by M. Carollo (Swiss Federal Institute of Technology, Zurich)

Martin Comares

## RECENT WORK

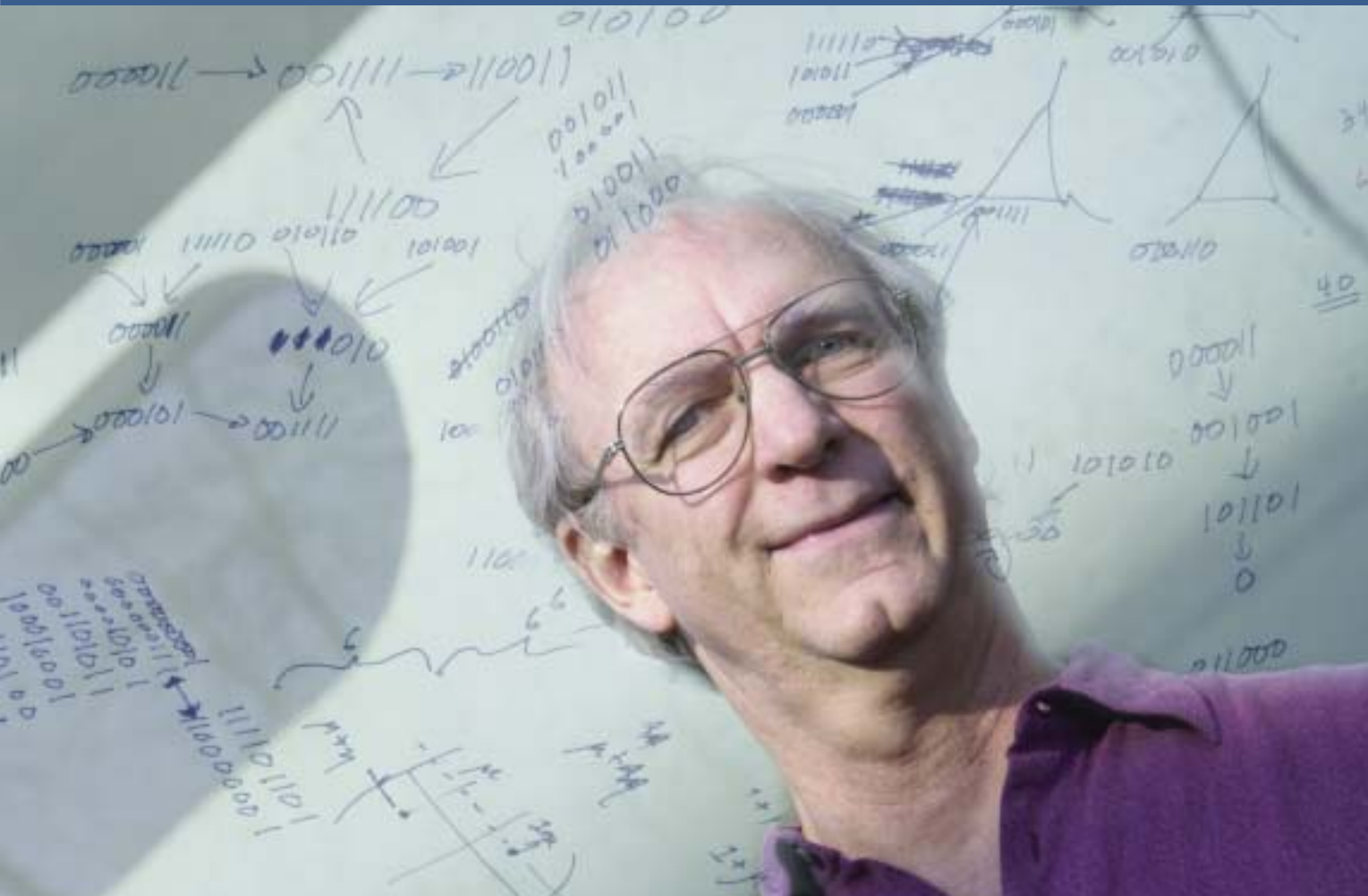
- Investigation of the properties of co-orbital asteroids moving in the same orbits as Earth and Jupiter, including recognition of the first asteroid with an Earth-like orbit.
- Development of low-cost instrumentation for studies of magnetic fields ranging from student labs to geophysical investigation.
- Founding of the Athabasca University Geophysical Observatory to provide modern, comprehensive instruments for space science research in Canada
- Finding a link between aspects of substorm activity worldwide. The substorm is one of the major unsolved problems of geophysics and taking a global view has given some insight into how it happens.
- Helping to establish the size of Mexico's Chicxulub crater, mainly through studies of the local terrain, or geomorphology. The size is important since formation of the crater is linked to the extinction of many species, including all dinosaurs and the 'firepower' involved can be determined from the size.
- Development of distance education techniques for home science labs that have allowed access to Athabasca University courses by hundreds of students.

# *Dr. Burton Voorhees*

Professor, Mathematics

**D**r. Burton Voorhees can trace the path of one of his two current research streams to an article he read twenty years ago, which described how fighter planes are designed to be flexible and maneuverable at the expense of stability.

It occurred to him then that there are general principles that could be applied universally.





Voorhees

“Usually, when people talk about any kind of system that involves development, or any evolutionary system, or any system where there is a question of control, they focus on stability,” Voorhees explains. “There’s a trade-off between stability and flexibility. If you want any sort of system that will be flexible and stable in an alternate environment, you have to look at other methods of control.”

After mulling over the idea for about two decades, he set out in the summer of 2002 to find a mathematical model that will allow this principle to be considered in other situations. With funding from National Sciences and Engineering Research Council and Athabasca University’s Academic Research Committee, and using work he has already completed on cellular automata, Voorhees is creating computer simulations to construct and test models of systems that maintain themselves in unstable states in order to gain behavioural flexibility.



His second path of research began in the late 1980s, when he recommended to the science faculty at Athabasca University that they implement a scientific reasoning course. Voorhees has always held an interest in how scientists think, and how that thinking affects scientific technique. By looking at scientific research, and at the various tools for thinking in science, he has been able to correlate the two in terms of how the scientific tools have helped scientists avoid errors.



"A lot of (scientific technique) ... isn't stuff you can directly say, 'This is how you do it,'" he explains. "It's more of an attitude. It's a way of looking at the material, then using various techniques for thinking about it. Techniques don't just work. You have to have a particular attitude to use them."


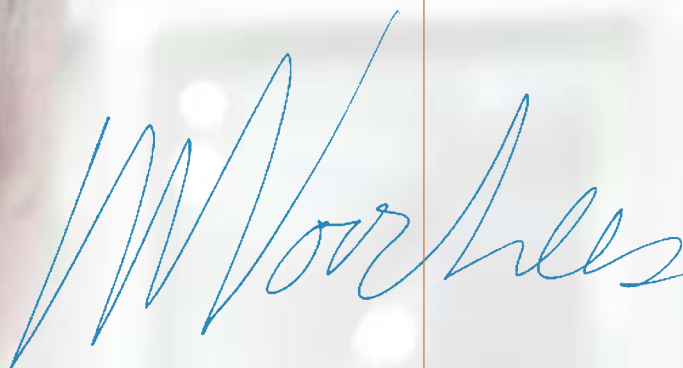

Creating a course about scientific reasoning allowed Voorhees the opportunity to research the subject more. It has also helped to fill what he sees as a void in the science education model.

"Normally science education students are expected to pick up on the underlying ways of looking at things by osmosis from their professors," he said. "That's starting to change a little in the last while, but certainly when I was going to university and grad school, that's the way it was."

Having worked as a mathematics professor at Athabasca University since 1982, Voorhees has come to appreciate how AU's flexibility benefits his research. "Working at AU provides a great deal more freedom in choice of research topics than at most universities," he said. "Basically I've been free to follow my own interests rather than having to stick to a research agenda set out by departmental policy or so forth.

"It's great to have a job where one can study what one finds most interesting," Voorhees added. "And from the world's perspective, there is a good deal of work going on now in both the areas of critical and scientific thinking, and in the behavior of complex systems, and I think that my research contributes to both of those areas."

Voorhees is also a sought-after presenter at science and mathematics conferences. His most recent publications include, "Completing the Copernican Revolution," and "Three Parameters Characterizing Cellular Automata."



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## RECENT WORK

- Authored "Completing the Copernicum Revolution Foundations of Science," 2002.
- Authored "Fractal Dimension, Probability, and Entropy in Matrix and Summation Substitution Systems," published in *Fractal* in 1999.
- Authored "Godel's Theorem and Strong AI: Is Reason Blind?" published in *Metadebates in Science Cornelis & Smets* in 1999.
- Authored "Correlational Analysis of Complex Systems," published in *Cybernetics and Human Knowing* in 1999.
- Authored "Three Parameters Characterizing Cellular Automata," published in *Complex Systems* in 2000.
- Authored "Dennett and the Deep Blue Sea," published in the *Journal of Consciousness Studies* in 2000.

## *Dr. Deborah Hurst*

Associate Professor, Organizational Studies

**D**r. Deborah Hurst has been associated with Athabasca University's Centre for Innovative Management in various roles since 1995; she became an associate professor of Organizational Theory and Behaviour in 2001. She specializes in the areas of organizational change, theory and analysis, learning organization, and managing diversity.

She says she has always been driven to learn and explore things about people and places, so her focus on the workplace and learning about human behaviour during change is a good match.

Hurst's interest in this area developed during her early career and education. She experienced challenges in her workplace, and became frustrated with the lack of access to advancement opportunities for young, unmarried women. This was in the early days of employment equity, at a time when some forms of workplace discrimination were accepted as commonplace. Despite the frustrations, Hurst took advantage of her employer's tuition refund program and over a ten-year period earned a Bachelor of Arts.

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Dr. Deborah Hurst



It was during her last two years of study that Hurst says, "life changed for me and I began to see my path very clearly." She found herself sitting on the edge of her seat during a class in Work and Organizational studies, and thought, "Wow, this is it. This is what I have to do!"

With this insight to her career path tucked under her arm, Hurst proceeded to complete both her master's degree and her doctorate, and went on to teach at a number of universities.

She chooses to work at Athabasca University, and the Centre for Innovative Management, because she likes the innovative approach that CIM takes to learning and education, and because of the flexibility and autonomy she has been afforded.

In addition to her teaching duties, she has been given opportunities to work on a potential new program that has broadened her experience. Her goal is to study different aspects of internal organizational change in an effort to improve the human condition at work. She looks at issues from employer and employee viewpoints and considers such things as team development, function, knowledge management, transferring tacit knowledge, contingent knowledge worker experiences and management issues, and changing psychological contracts as a result. Virtually every topic she studies, whether on her own or with colleagues, is geared toward the goal of improving the human condition at work.



A handwritten signature in blue ink, appearing to read 'Johanna Hurst', is positioned above the 'RECENT WORK' section. A thin orange vertical line with a downward-pointing arrow is located to the right of the signature.

## RECENT WORK

- Co-authored "Virtual Team Development: Building Intellectual Capital and Cultural Value Change," published in *The Collaborative Work Systems Fieldbook* in 2002.
- Co-authored "For Better or Worse? Assessing the Costs and Benefits of Contingent Knowledge Work as an Investment in Intellectual Capital," published as Chapter 6 in *World Congress on Intellectual Capital Readings* in 2001.
- Edited "Proceedings: Organizational Theory, Taking Stock, ASAC/IFSAM 2000," for the Administrative Sciences Association of Canada.
- Developed case study and teaching notes for the Acadia Institute of Case Studies' "Pro-Net Business Connections," in 1999.

## *Dr. Malinda Smith*

Associate Professor, Political Science

*Malinda S. Smith*

**D**r. Malinda Smith has always been interested in global politics and relations. She first encountered racial and global inequality growing up in The Bahamas under British colonial rule, where she witnessed how expatriates, simply by virtue of being British, were considered intellectually and morally superior.

However, she also learned that inequality is not inevitable and it need not be permanent. The Bahamas achieved its independence, and gradually emerged into a multicultural and multiethnic society in which education and hard work became more important than “race” in determining one’s social position in life.

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Dr. Malinda Smith





## Malinda S. Smith

She also learned that the issues she faced in The Bahamas were not unique to that country. She attended school in the United States and experienced both opportunities and obstacles rooted in her skin colour, her ethnocultural heritage and her gender. These experiences made her want to understand better why discrimination based on race, gender, sexuality and national heritage, among others, exist and what can be done to eliminate these forms of discrimination.

With this background to influence her, Smith's current research and publications focus on three broad areas: issues of diversity, equity and ethno-cultural minorities in Canada; globalization and its impact upon the South; and political and economic governance in Africa.

She has authored and co-authored numerous publications, served as a panelist and media expert on a variety of topics relating to her area of expertise, and has been a presenter at conferences around the world.

Smith appreciates the opportunities available to her at Athabasca University to pursue her teaching and research. She is no stranger to distance education institutions since she took courses from the U.K.'s Open University while still living in The Bahamas.

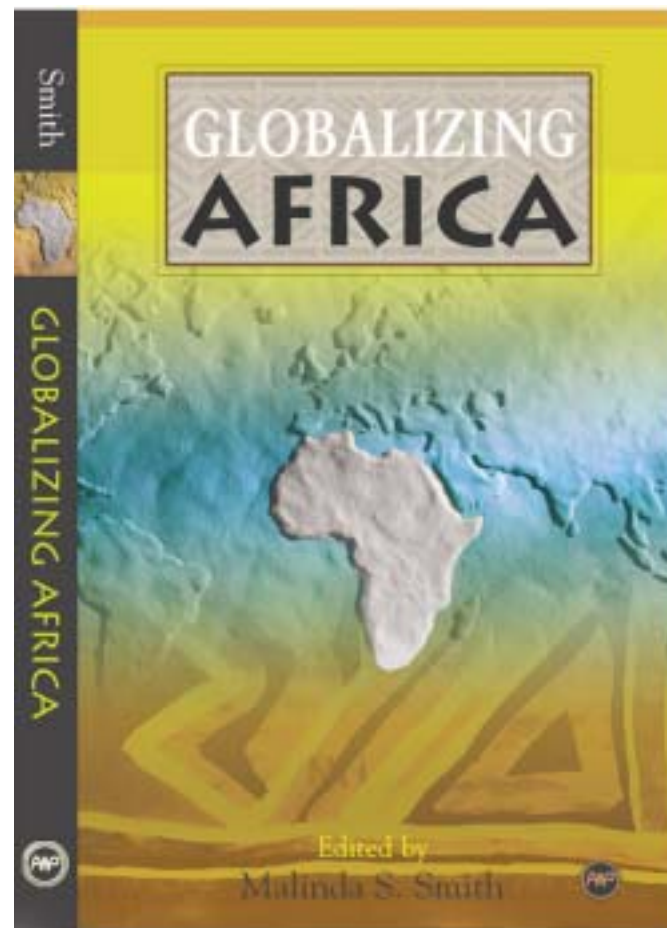


"I learned a lot by distance and was, and continue to be, inspired by this experience," Smith says. "Athabasca University has allowed me to connect these experiences, and build on them since I did not have access to the Internet when I took DE (distance education) courses. My students can be literally located around the world (from Egypt to Bermuda and the U.S.) and they all bring their diverse knowledge, experiences, and understanding to each course."

Her hope is that her research will lead to understanding and a commitment to activism in several areas, including an understanding of difference, and the perception of differences that exists in Canada and the global community. Second, where those differences lead to conflict – from racial conflict/racism to civil war – Smith hopes her research can help explain the causes or factors that give rise to interpersonal or intercultural conflict, illuminate ways of preventing and managing conflict in human society, and explore the possibilities of reconciliation.

She also hopes her research will provide some useful insights for policymakers, to determine benchmarks and best practices in political, economic and social development.

Most of all, Smith says, "I hope my cautious optimism can encourage a commitment to activism and social change."





Malinda S. Smith

## RECENT WORK

- Authored "Representations of Postcolonial Africa," in *Globalizing Africa* in 2003.
- Authored the Preface and edited *Globalizing Africa* in 2003.
- Authored "'Race Matters' and 'Race Manners,'" published in *Reinventing Canada: Politics of the 21st Century* in 2003.
- Authored "Globalization, Postmodernism, and International Relations Theory," published in *Critical Concepts: Introduction to Political Science* in 2002.
- Authored "Afrocentricity," published in *The Routledge Encyclopedia of Feminist Theories* in 2002.

Athabasca University is the premier distance education university in Canada and is recognized as one of the world's leading open and distance learning universities. The credibility of this claim rests not only on the uncompromisingly high quality of instruction and services the university offers to its students, but also on the quality of research and scholarly output of individual faculty members and their respective academic centres.

- In the past four years, Athabasca University's research funding dollars from external sources has increased exponentially, and the total number of research projects launched each year has more than doubled. Today Athabasca University supports over 55 externally funded research projects.
- About four per cent of Athabasca University's annual budget is dedicated to funding mission critical and academic research, particularly in the area of distance education.\*
- Since the Canada Research Chairs Program was announced in December 2000, Athabasca University has appointed two Canada Research Chairs, and has submitted an application for a third appointment.
- Researchers have received funding from numerous sources, including: Industry Canada, Canada Foundation for Innovation (CFI), Natural Sciences and Engineering Research Council of Canada (NSERC), Social Sciences and Humanities Research Council of Canada (SSHRC),

Human Resources Development Canada (HRDC) and Canadian Institutes of Health Research (CIHR). The government of Alberta has provided funding primarily through Alberta Innovation and Science, and Alberta Learning.

\* This statistic includes a portion of professor salaries dedicated to time spent in research.

### Athabasca University's external research funding amounts for 1998-2002





**Contact information:**

Research Centre  
Athabasca University  
1 University Drive  
Athabasca, AB T9S 3A3  
Canada

Phone: (780) 675 6275  
Fax: (780) 675 6722  
E-mail: [deborahz@athabascau.ca](mailto:deborahz@athabascau.ca)  
Web-site: <http://www.athabascau.ca/research/>

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