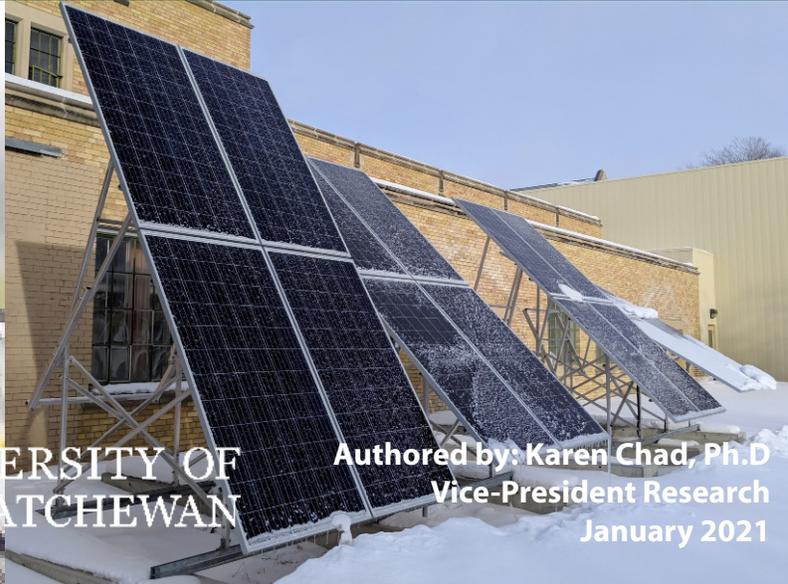




# Reflecting on our Signature Areas of Research



## *Discovery the World Needs*



UNIVERSITY OF SASKATCHEWAN

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*T*he journey of developing and implementing the signature area strategy has been for me a guiding light in my roles as academic leader, researcher, and university citizen.

As I leave the position of Vice-President Research, I would like to share this remarkable journey of visionary leadership at many levels of strategy and collegiality, of risk taking and passion, and of trust and determination.

This document records the origins of the journey and provides a narrative of what was done and why. It is intended as a moment of reflection at this stage of a journey and not a description of a destination.

Undoubtedly in the future there will be evaluations of all or parts of the signature areas and other elements of the institution's research strategy.

I hope this document serves as an important touchstone, a testament to the importance of being bold in our individual and institutional aspirations, and of acting with focus and commitment.



**Karen Chad, Ph.D**  
**Vice-President Research**  
**University of Saskatchewan**

# ASPIRING TO BE AMONG THE VERY BEST IN THE WORLD

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In 2002, the University of Saskatchewan (USask) affirmed our mission and adopted bold commitments about the kind of university we wanted to be. We committed to be true to our sense of place here in Saskatchewan while aspiring to earn influence and respect among national and global peers. We insisted that we would hold ourselves to rigorous international standards in all that we do, and we aspired to be among the very best in the world in key areas of research pre-eminence.

It took some time for the meaning of these aspirations and commitments to take hold. In 2008, we adopted a research strategy which included five elements: focus, leadership and accountability; research-focused faculty complement; supportive environments; and metrics. While focus is critical to any organization, how would this institution – with a broad mandate for research and education, with one of the broadest arrays of disciplines and academic programs of any Canadian university, with 1,000 faculty engaged somewhat independently in often single-researcher discovery and scholarly work, with uneven levels of research activity across the campus – go about identifying where, and how, to focus its research efforts? In 2010, that was answered with the identification and articulation of what we came to call “signature areas”.

This is the story of how a university used the power of its collegial culture and a legacy of community connections to define for itself what it would be known for its research as it looked forward to its second century. What would be the handful of areas of scholarly work where our university would be seen to be a leader among national and global peers, those areas where our people would hold a place of respect and influence at home and far away?

This is the story of how the signature areas influenced decisions by individual researchers, by senior university leaders, and by those outside the university who chose to invest in what this university could do. Would the university culture support the making of choices that would focus strategic resources? Would a humble prairie university believe it could attract faculty and research leaders who were already globally pre-eminent in their own right? Would a mid-sized university in a sparsely populated province be able to compete for national leadership and national investments among a field of larger universities backed by larger populations?

**This is a story of what has been accomplished over the decade since the signature areas were declared.**

Not all six signature areas have developed at the same pace. Signature areas were chosen because there was strength at USask, but often it was pockets of scattered strength in disparate disciplines. Encouraging and enabling collaborative and interdisciplinary research takes time and effort.

However, the evidence is abundant that USask has been indelibly shaped by the bold initiative to adopt research signature areas, by the collegial processes that were used to identify them, and by the confidence to use them as a tool for focusing decisions when choices could be made.

While the university’s signature areas will undoubtedly evolve, the lessons learned will continue to inform the university about the power, processes and possibilities of research focus in an academic environment.

# THE PATH THAT LED TO OUR SIGNATURE AREAS OF RESEARCH

## Learning about ourselves

The first step of our strategy was to embark upon a collegial process to learn about and describe the current landscape of our research, scholarly, and artistic work.

To do this, the VPR established an “Advisory Committee on Areas of Research, Scholarly and Artistic Strength and Emerging Strength”<sup>1</sup>, with representation from the Research, Scholarly and Artistic Works (RSAW) and Planning Committees, the Associate Deans Research Forum, faculty members, the Graduate Student Association, and the Office of the Vice-President Research (OVPR).

The Advisory Committee:

- Took a broad consultative approach to gather information from the whole of the academy;
- Compiled, reviewed, and analyzed over 150 submissions;
- Drafted the document *Extending Horizons: University of Saskatchewan Research, Scholarly and Artistic Landscape* to recognize and celebrate this work, and which provided an integrated perspective of research, scholarly, and artistic activity and ways in which college or centre activity were enhanced by activities in another unit;
- Circulated *Extending Horizons* widely for feedback; and
- Finalized the content and language of *Extending Horizons* based on extensive input from committees and individuals, and put it into the public domain.

## Learning from others

Next, the VPR undertook an environmental scan of Canadian medical-doctoral universities<sup>2</sup> to ascertain how many had identified areas of strategic priority or strength and what process they had used to determine those areas.

Based on this scan, and in consultation with RSAW and University Council, the VPR based the process on three key principles:

- It would be informed by university processes and documents, such as Integrated Planning, Systematic Program Review, and documents from academic units and research centres;
- It would be sensitive to the diverse ways that faculty, students and staff pursue and undertake research, scholarly and artistic activities; and,
- It would involve a collaborative approach to ensure opportunities for members of the university community to provide input on the strategy, indicators and final areas.

## Implementing the process

A working group<sup>3</sup> was formed through broad consultation and went on to establish the criteria, which included:

- Relevance to issues of national and international priority;
- Impact for the benefit or betterment of society;
- Contributions to innovation;
- Strategic significance to Canada and the world;
- Ability to attract resources (due to public interest, private interest, and relevance);

<sup>1</sup> Karen Chad, Laura Zink, OVPR; Val Korinek, History; Rob Pywell, Physics & Engineering Physics; Spiro Yannacopoulos, Engineering (replaced by Greg Schoenau, Engineering); Jim Thornhill, Medicine; Hartley Furtan, Agriculture (replaced by Vikram Misra, Veterinary Medicine); Deb Saucier, Psychology; Lou Hammond-Ketilson, Commerce; Pamela Haig-Bartley, Drama; Nicole Berard, English

<sup>2</sup> Dalhousie, McGill, Ottawa, Queen’s, Toronto, McMaster, Western, Waterloo, Manitoba, Alberta, Calgary, British Columbia

- Significant (broad, deep, inclusive) collaboration and engagement, as demonstrated by:
  - Cross-unit critical mass;
  - Use of local/national facilities, infrastructure and resources;
  - International partnerships;
  - Government, industry, and community linkages;
- Prominent reputation, as demonstrated by:
  - International achievement;
  - National and international awards and recognition;
  - People of international stature;
  - Publications, citations, performances, exhibitions, etc.;
  - Direct economic and societal impact;
  - Ability to attract resources;
  - Success in attracting graduate students and post-docs;
  - Invited presentations at national and international conferences;
  - Contributions to service facilities, community organizations, public debate;
  - National and international collaboration on creative activity/performance;
  - Participation on national review committees, editorial boards, etc.; and
  - Public profile.

In 2009, the VPR hosted stakeholder-specific workshops and also provided an online option to elicit input on the following questions:

- What are the areas that would bring USask distinct recognition and distinguish us as leaders in Canada and among the very best in the world?
- How will these make USask stand out based on our research output, capacity, investments, history, and sense of place?

This workshop included participation from the following stakeholders:

- Undergraduate and graduate students;
- Post-doctoral fellows;
- Faculty members;
- Canada Research Chairs Forum;
- Department heads;

- RSAW;
- Associate Deans Research Forum;
- Deans;
- Centre directors;
- President's Executive Committee;
- Other senior leaders; and
- External stakeholders.

The final step was to use an innovative jig-saw methodology to synthesize and analyze the input from the widespread consultations:

- Initial grouping: All areas of strength identified from each workshop were grouped according to similar research areas, regardless of the language used to describe them (e.g., water, hydrology, toxicology, fresh water, ground water);
- Synergies between the clusters: The initial groups were reviewed to see whether there were any overlap or synergy between the clusters of groups. Approximately 10 research area clusters were originally identified but then condensed to six;
- Broad themes: a consensus around several broad themes emerged: Aboriginal, Agriculture, Energy, Infectious Disease, Synchrotron, and Water; and
- Two-phased titles: The Working Group drafted several versions of two-phase titles for each area. The first part of the title described the area and the second part signified the impact.

**“Institutionally, when you start telling the story, you start to see success stories everywhere. Our signature areas serve as a magnet to pull together folks working across these areas. They have an energy that draws folks together to raise the collective awareness of what’s happening across campus.”**

– Angela Bedard-Haughn, Dean of the College of Agriculture and Bioresources

<sup>3</sup> Jim Basinger, Karen Chad, Beth Horsburgh, Peter MacKinnon, Jim Miller, Bill Thomlinson, Andrew Van Kessell, Kathryn Warden, Bill Waiser

In March 2010, the President and VPR shared and tested these results with the USask community. All attendees at previous consultation sessions and all faculty across campus were invited to participate in this workshop, to provide feedback on the draft titles and themes and examine the credibility, relevance and distinctiveness of each theme. Further opportunity for input from the campus community was garnered through a web survey.

The language for each signature area was further refined internally and then externally validated by leading national and international researchers.

## Adoption of signature areas

In June 2010, President Peter MacKinnon presented the signature areas of outstanding achievement - enabled by our research capacity, investments, history and sense of place - to University Council and the Board of Governors.

President MacKinnon stated: "These signature areas will lift our whole institution to another level of research and scholarship."

**"Collaborative management of signature areas by Dr. Chad meant that faculty who identified as female witnessed a female visionary in an upper-level decision making role, a fact that inspired younger faculty to know that there is a pathway for them to be involved in strategic decisions of the university one day, and to have a say in future signature areas that can advance their careers."**

– Lori Bradford, Assistant Professor, School of Environment and Sustainability

## Signature Areas of Research

### AGRICULTURE

Food and Bioproducts for a Sustainable Future

### ENERGY AND MINERAL RESOURCES

Technology and Public Policy for a Sustainable Environment

### INDIGENOUS PEOPLES

Engagement and Scholarship

### SYNCHROTRON SCIENCES

Innovation in Health, Environment and Advanced Technologies

### ONE HEALTH

Solutions at the Human-Animal-Environment Interface

### WATER SECURITY

Stewardship of the World's Freshwater Resources

# REFLECTING ON A DECADE OF DISCOVERY THE WORLD NEEDS

## Key themes, a decade on:

Our signature areas **address big global challenges and opportunities** and have helped us **compete nationally and globally**.

Adopting signature areas **changed our research culture for the better**, fostering interdisciplinary collaboration and aspiration.

Our signature areas **strengthened our profile and reputation**, playing a key role in our invitation to the U15 group of top research universities.

Embracing signature areas has enabled us to **secure unprecedented funding** and better **leverage investments**.

Signature areas have **better positioned us well for partnerships** with industry, governments and communities.

Our signature areas have **served as a talent magnet**, helping us recruit top-notch faculty, post-doctoral fellows, and students.

## Addressing big global challenges and opportunities

No university can be nationally and globally pre-eminent in all areas of research. That is why it is vital to explicitly identify areas of strength, while continuing to foster areas of emerging strength. In the words of former dean and provost, Ernie Barber, “You cannot stand tall when you have 1,200 faculty doing 1,200 independent research initiatives, all in different areas. You have to create mountains; it can’t all be plains. And you have to use the signature areas to bring people around the mountains in the foothills. We’ve got to see ourselves with some mountains and some foothills as well.”

**“You have to create mountains; it can’t all be plains.”**

– Ernie Barber, former Dean and Provost

Our signature areas were not built around specific disciplines. Rather, they were built around the big issues the world is facing. They were intentionally framed to foster interdisciplinary collaboration that tackles really significant global challenges and seizes exciting global opportunities.

Being explicit about our strengths and, in so doing, targeting big global challenges and opportunities has been an essential element of improving USask’s national and global competitiveness.

**“Signature areas help us be known and stand out – to be the university the world needs.”**

– Ingrid Pickering, Canada Research Chair in Molecular Environmental Science

## Changing our research culture by promoting collaboration and interdisciplinarity

Identifying select areas of research pre-eminence has profoundly changed our research culture over the past decade. In many ways, this gave researchers permission to be proud and ambitious, moving away from what some described as a “tall poppy syndrome” environment, in which there was fear that you would be cut down to size if you stood out.

As former President, Peter MacKinnon, says: “There were always some excellent pockets of research, some wonderful researchers, to be sure, but overall when you looked at the research performance of the university, its performance was weak. ... The signature areas served as a focus for the debate that had to take place at the University of Saskatchewan: Are we serious about being a research university, or are we not? I think the signature areas have brought success to the university that frankly would not have been as great without them, and they have contributed significantly to a changed culture at the university.”

**“... they have contributed significantly to a changed culture at the university.”**

– Peter MacKinnon, former USask President

According to President Peter Stoiceff: “The signature areas stood as confidence-building examples for the rest of the university. We don’t just talk about interdisciplinarity but, in some crucial ways, we’ve been able to actually succeed at it.”

Signature areas were intentionally designed to be broad enough to span the university, encompassing many disciplines. The totality of research within any signature area is comprised of contributions from several colleges, schools, and units.

Not surprisingly given the importance of Indigenization to the university, a prime example

of a signature area that encompasses many disciplines is *Indigenous Peoples*. There are more than 150 researchers – Indigenous and non-Indigenous – undertaking research related to this signature area in all colleges across campus, and these faculty are training the next generation of researchers in diverse aspects of Indigenous scholarship and engagement.

Interdisciplinarity is also the hallmark of the *Water Security* signature area. Built on longstanding strengths in cold-region hydrology, this signature area led to a successful application for a \$30-million Canada Excellence Research Chair (CERC), which attracted renowned hydrologist Howard Wheater from the United Kingdom. Wheater notes he came to USask because there was “so much potential”, with demonstrated research strengths including toxicology, health and public policy, along with a synchrotron. “I basically used the CERC funding to bring people together in a very interdisciplinary way, and we were very successful. People just weren’t used to working together – they need incentives to overcome those barriers to work together. The signature areas provided that incentive.”

Wheater says people discovered a new way of working across disciplines and academic units. “People certainly discovered that they could work with people from complementary disciplines – and that really there was a lot to be gained by that. Once we got a new method of working together, then we were very successful at developing much larger-scale funding.” Wheater maintains that signature areas helped faculty achieve more together than was possible individually: “Academics tend to do their own thing and follow a narrow path, but to address society’s problems, we need to have a bigger vision and work together on common problems.”

Notably, the Global Institute for Water Security (GIWS) has also built strong linkages with the arts. The play ‘Downstream’, produced in collaboration with the drama department and an Indigenous traveling art show, were co-designed to address climate change and water management issues. The Global Water Futures (GWF) research program collaborated with a Russian painter and the local ‘Men Who Paint’

group of artists to bring fresh perspectives to water science.

This eager embrace of interdisciplinary collaboration helped make USask the top in water research in Canada and put us on the global map in a really big way – currently ranked in the top 20 in the world. As Wheeler concludes, “That really wasn’t the case before these signature areas were created.”

The *Agriculture* signature area is built upon the longstanding history and continued leadership of the College of Agriculture and Bioresources. Virtually every academic unit now contributes to research in this area. For example, Agriculture and Bioresources researcher Kate Congreves is leading an interdisciplinary research team that will establish the province’s first greenhouse gas monitoring station determining the net carbon footprint of cereal rotation. Through ‘Designing Crops for Food Security’ Canada First Research Excellence Fund (CFREF) program, computer scientists are teaming up with plant scientists, remote sensing specialists and crop breeders to apply machine learning techniques to plant breeding. Public Policy scholar Peter Phillips is exploring global gaps in regulatory and innovation policy, and Pharmacy and Nutrition researcher Carol Henry is teaming up with others to assess how agricultural practices and genetic variability affect the nutrient composition of high-value food crops, scaling up pulse innovations for food nutrition security in Ethiopia.

We have also seen important research at the intersection of signature areas, including:

- *Synchrotron Sciences and Agriculture*: using the Canadian Light Source (CLS) to advance agriculture (e.g., looking at how to improve chickpea feed for cows or to improve soils for crops);
- *Synchrotron Sciences and Water Security*: using the CLS to look at metals in water (e.g., arsenic in Bangladesh drinking water);
- *Water and One Health*: Water scientist Corinne Schuster-Wallace is tackling the growing problem of groundwater quality in wells used as a drinking source for people and livestock;
- *Water Security and Indigenous Peoples*:

The GWF program includes six research projects across Canada that are co-created and co-led by Indigenous communities to address issues from drinking water quality to mitigating the impacts of dams on Indigenous communities; Engineering researcher Kerry McPhedran is working with Indigenous communities to co-design water services and infrastructure;

- *Energy and Mineral Resources and Indigenous Peoples*: Researchers Bram Noble and Greg Poelzer are leading an \$8.8-million SSHRC-funded international partnership to explore how northern residents can achieve energy independence and benefit economically and socially through renewable energy;
- *Energy and Mineral Resources and Synchrotron Sciences*: Engineering researcher Ajay Dalai uses the synchrotron for his cutting-edge work to develop synthetic gas;
- *Agriculture and Water Security*: At the Livestock and Forage Centre of Excellence (LFCE), engineering researcher Warren Helgason, water scientist Phillip Harder, and GWF director John Pomeroy are measuring crop growth and evaporation using drones and new sensors to learn how much water crops use in their growth;
- *One Health and Food Security*: To advance the livestock industry’s economic contributions and ensure continued consumer confidence in Canadian beef safety and quality, veterinary researcher Cheryl Waldner is studying antimicrobial use and resistance in beef cattle to inform industry stewardship practices.

**“Having signature areas contributes to the sense that there’s a buzz here, that there’s a lot of high-quality research happening. There’s then interest and investment from the outside. All of this creates a really nice impression about the place.”**

– Steve Rayan, Director of the Centre for Quantum Topology and Its Applications (quanTA)

## Strengthening our profile and reputation

Prior to the adoption of the signature areas, it was difficult to explain what USask stood for or was achieving in the research realm. The university's narrative about itself was largely riding on the coat-tails of past achievements, such as cobalt-60 cancer therapy, the summer fallow approach to crop land, and lentil varieties developed in the 1970s. According to former Minister of Advanced Education, Rob Norris, "The provincial and federal governments were investing hundreds of millions annually but didn't really understand what the university's research was about. It took a lot of time for government officials to try to understand what those priorities were. And some priorities weren't clear or there wasn't a consensus around them, even within the campus community."

Signature areas did not just identify institutional strengths, they framed an authentic narrative that helped develop a more clearly defined brand identity. As President Stoicheff says: "The introduction of signature areas made clear to our external stakeholders, including in Ottawa, that there are many things besides agriculture that we excelled at. That helped put us on the national map and then on the global map. It's through our signature areas in part that we are able to say we are the university the world needs. For instance, I am always pointing to the Global Institute for Water Security, the Global Institute for Food Security, and VIDO-InterVac as examples of how we are the university the world needs. If we didn't have signature areas, we'd risk seeing ourselves, and the rest of the world seeing us, as a comprehensive university whose main mission is one of access at the undergraduate level. Potential graduate students and post-docs from around the world would not be able to identify us as standing for research excellence in these areas."

**"It's through our signature areas that we are able to say we are the university the world needs."**

– Peter Stoicheff, USask President

Former president Peter MacKinnon says, "Definitely the University of Saskatchewan enjoys a profile in the signature areas that it would not have at all, were it not for them." In fact, **MacKinnon says our signature areas played a critical role in USask's admission as a member of the U15 Group of Research Universities in 2011:** "I was there when that happened. I think it was very, very important and was related to the signature areas. When David Naylor (head of the U15) phoned me, he cited some of the work that had been done in signature areas and the growing profile of the University of Saskatchewan in some of the related research. And that meant the university had to have research activity commensurate with its new status as a U15 university."

Over the last decade, 60% of major external awards and recognitions went to faculty members engaged in research that is directly connected to a signature area.

Signature areas have also impacted USask's performance in international rankings:

- For the past three years, USask has been ranked first in Canada and in the top 20 in the world for water resources research, according to the Academic Ranking of World Universities (ARWU);
- GWF claimed first place in the Web of Science's ranking for "Global Leader in Science Dissemination" (number of peer-reviewed journal articles and total citations), and fourth place in "Global Leader in Social Impact" (quality of research); and
- USask placed in the top 100 (96<sup>th</sup> overall) in the world with the 2020 Times Higher Education (THE) University Impact Rankings, which measures the success of universities in advancing the United Nations (UN) Sustainable Development Goals (SDGs). USask ranked fourth in the world in "Zero Hunger", a ranking which recognizes USask as a global leader in food security, crop development and agriculture research. USask also ranked highly on water-related sustainability rankings – "Life Below Water" (38<sup>th</sup>) and Clean Water and Sanitation (tied for 56<sup>th</sup>).

The *Water Security* signature area has helped foster seven Royal Society of Canada Fellows, five American Geophysical Union (AGU) Fellows, one Hydrologic Science Lifetime Achievement Award, two Prince Sultan Bin Abdulaziz International Prize for Water winners, one Einstein Professor Chinese Academy of Science, one Tuzo Wilson Award (Canada's leading science award in the natural sciences) and a president of the 7,500-member Hydrology Section of the American Geophysical Union (AGU), one of the world's biggest hydrology groups.

A major impact from USask-led water research has been the successful effort to persuade the federal government of the need for changing Canada's water governance and creation of the Canada Water Agency, which was announced in the fall 2020 Throne Speech.

Signature area achievements have brought national and international profile through strategic research communications and media coverage. As just one example, a news release about GWF director John Pomeroy's meeting with Greta Thunberg on a glacier in the Rockies to discuss glacier decline and climate change generated more than 430 news stories in national and international publications and audience "reach" of 854,000 (views, unique visitors, and shares). The number of unique page views for the stories was 183 million.

Signature areas have enabled the University of Saskatchewan to be at national and international tables from which it otherwise might have been excluded, and to lead national collaborations in a way that other institutions recognize as credible and essential. For example, as a leader of the renowned infectious disease research hub, VIDO-InterVac director Volker Gerdtts participates at World Health Organization meetings, and USask water scientists regularly participate in the World Meteorological Organization, UNESCO, and the World Climate Research Programme.

Signature areas have also spurred international collaborations, such as the agreement with India's renowned Bangalore Water Security

Institute, which recognized USask's leadership in understanding the change taking place in the world's cold regions that provide about half the world's population with their water, and in developing tools to predict the future in areas such as the Rocky Mountains, the Andes, Tibetan Plateau, and the Himalayas.

Signature areas have been important to local communities, including First Nations and Métis communities in the Prairies. As Michelle Johnson-Jennings, CRC in Indigenous Community Engaged Research, says: "I think the signature areas have also been significant from a community standpoint. Our history has been fraught with universities taking information and preying upon Indigenous communities and when you are able to elevate that to the level of a signature area and an area you really value and respect, communities also see that and are excited about the ability to equally partner and to be in a place where there is mutual respect that goes both ways. As an Indigenous community member that's important."

**"... the signature areas have also been significant from a community standpoint"**

– Michelle Johnson-Jennings, CRC in Indigenous Community Engaged Research

## **Securing funding and leveraging investments**

Former CEO of Innovation Saskatchewan Jerome Konescni says, "The signature areas have enabled the university to attract investment and funding that it wouldn't have had without having clearly defined signature areas, and then recruit and attract top people to those areas. That has made a big difference – whether you are a funder or a potential collaborator."

**“The signature areas have enabled the university to attract investment and funding that it wouldn’t have had without clearly defined areas.”**

– Jerome Konescni, former CEO of Innovation Sask.

Indeed, signature areas have helped frame strategic applications for research funding programs, bolstering success in competitions and resulting in increased research funding for the university.

Since 2010, a total of more than \$33 million (tri-agency and non-tri-agency funds) has been awarded for signature area-related research chairs. Depending upon the signature area, this funding ranges from \$600,000 to over \$18 million for a wide variety of research chairs (currently 130 across the campus).

Having clear areas of demonstrable excellence has lent credibility to USask applications for federal funding for the Canada 150 Research Chair in Hydrology and Remote Sensing, two Canada Excellence Research Chairs (CERC), and two Canada First Research Excellence Fund (CFREF) programs (the only university with two CFREF awards).

For the GWF CFREF, President Stoicheff is clear: “Without the *Water Security* signature area, it is unlikely we would have moved from being short-listed for the water CFREF to being chosen for it. The panel wanted evidence that this funding would be going to a university that had strategic areas of proven research success. I remember the panelists saying, ‘We need to know that you have the foundation of excellence to achieve a great deal more with a CFREF, and that you have the capability to run a large program that is truly interdisciplinary.’ If we were not able to point to signature areas, we would not have been very convincing in answering that question.”

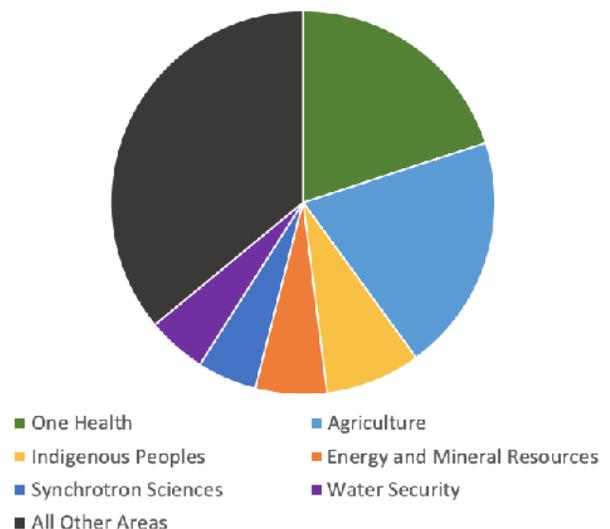
Signature areas have helped secure several research chairs:

- *Agriculture* (39);
- *One Health* (23);
- *Energy and Mineral Resources* (22);
- *Water Security* (9);
- *Synchrotron Sciences* (9); and
- *Indigenous Peoples* (5).

The University Research System (UnivRS) tracks research projects from concept to completion and enables researchers to easily identify relevant signature areas, however UnivRS was not deployed until 2016. Prior to the UnivRS roll out, the university did not systematically collect or track information on relevant signature areas for research projects. As such, reliable data is only available from 2016 onward.

Since UnivRS tracking began in 2016, almost two-thirds of external funding applications (64 per cent) identified a signature area, with the following breakdown:

- *One Health* (20%);
- *Agriculture* (20%);
- *Indigenous Peoples* (8%);
- *Energy and Mineral Resources* (6%);
- *Synchrotron Sciences* (5%); and
- *Water Security* (5%).



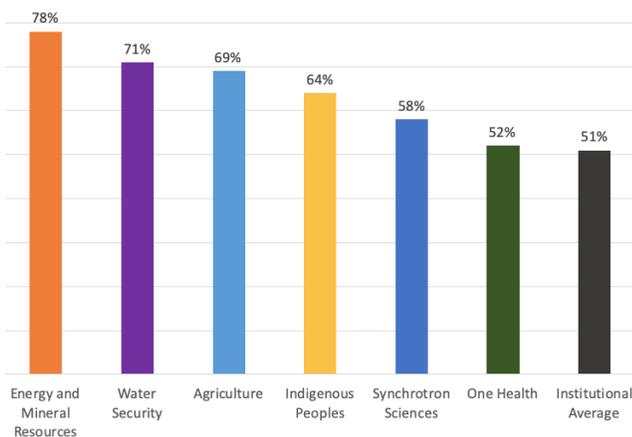
External funding applications since 2016

In four signature areas, growth in external funding applications outpaced all non-signature areas of research (+21 per cent):

- Indigenous Peoples (+94%);
- Water Security (+54%);
- One Health (+46%); and
- Agriculture (+36%).

All signature areas had higher success rates in securing external funding than USask's institutional average of 51%:

- Energy and Mineral Resources (78%);
- Water Security (71%);
- Agriculture (69%);
- Indigenous Peoples (64%);
- Synchrotron Sciences (58%); and
- One Health (52%).



Success rates in securing external funding since 2016

Since UnivRS tracking began in 2016, external funding awards not identified with a signature area declined by 26 per cent, while all signature areas saw significant increases in external funding awards:

- Indigenous Peoples (+300%);
- Agriculture (+121%);
- One Health (+115%);
- Water Security (+83%);
- Energy and Mineral Resources (+45%); and
- Synchrotron Sciences (+37%).

The vast majority – 80 per cent – of the value of research contracts in the most recent academic year was identified with a signature area, up from 17 per cent in 2016.

The following are a few examples of funding successes within each of the signature areas:

### **Water Security**

Launched in 2011, GIWS brings together more than 95 faculty from 21 academic units. GIWS has recruited 15 core faculty members (seven through the Water Security CERC and eight through the Global Water Futures CFREF program). In addition, creation of the *Water Security* area has spurred departments to hire faculty in water-related areas of research (i.e., engineering and SENS). Between 2011 and 2019, GIWS secured \$282 million in research grants and contracts. More than 719 graduate students, 181 post-doctoral fellows, and almost 640 research associates, scientists and research assistants have been trained. The GWF program – established in 2016 within GIWS with \$77.8 million from the CFREF – has almost quadrupled that investment, by leveraging \$295 million in additional research funding and in-kind contributions. GWF is the world's largest university-led freshwater research program, with 190 professors from 18 Canadian universities and 26 international joint faculty appointments. As well, Jay Famiglietti, recruited from NASA's Jet Propulsion Laboratory, was appointed in 2017 as a Canada 150 Research Chair, with \$7 million in federal funding.

### **Agriculture**

The university's *Agriculture* signature area has attracted major federal and provincial research funding, including a significant number of industry and government-sponsored research chairs in the College of Agriculture and Bioresources. The CERC in Food Systems and Food Security – funded by \$13 million from the federal government, \$7 million from GIFS, and \$3 million from USask – has leveraged another \$4 million in research dollars, including from the Canada Foundation for Innovation, the Saskatchewan Agricultural Development Fund, and the Canola Agronomic Research Program. The CERC program, which spans biology, chemistry, computer science, bioinformatics, engineering, physics, mathematics, and public policy, has 46 HQP working to improve crops. Agriculture and Bioresources researcher and CERC Holder Leon Kochian was awarded the 2019 Arrell Global Food Innovation Award for excellence in food innovation and community impact.

Through our other successful CFREF, the \$37.2-million federal investment in USask's Plant Phenotyping and Imaging Research Centre (P2IRC), managed by GIFS, has leveraged more than \$6.3 million from external partners to develop innovative digital technologies to accelerate plant breeding. P2IRC involves more than 75 faculty from across campus, including three new faculty recruits. P2IRC has established 54 partnerships and nearly 40 collaborations.

GIFS – established in 2012 with \$35 million from Nutrien (then PotashCorp) and \$15 million from the Saskatchewan government – has leveraged \$75 million in matching funds from government and industry to discover, develop and deliver innovative solutions for sustainable global food production. With 240 institutions and organizations now in the GIFS Research Network, the institute is increasing regional, national and global impact through collaboration, including a partnership with Bangladesh to promote sustainable food security. GIFS is also launching the Omics and Precision Agriculture Laboratory (OPAL) with almost \$3.4 million from Western Economic Diversification, National Research Council, Agriculture and Agri-Food Canada and USask. GIFS was also the first university-based consortium to sign on to Protein Industries Canada and it now plays a significant role in this federal supercluster initiative.

### **Indigenous Peoples**

With its focus on Indigenization and the *Indigenous Peoples* signature area, USask has attracted top researchers, particularly in health-related fields. Working with Indigenous communities, this powerful Indigenous health research expertise is supporting community-based research and showing escalating strengths in the areas of Indigenous health, the environment, and justice:

- USask is home to the CIHR Institute for Indigenous Peoples' Health, led by Carrie Bourassa;
- Recruitment of Alexandra King (Cameco Chair in Indigenous Health and Wellness) and Malcom King (scientific director of the Saskatchewan Centre for Patient-Oriented Research) has led to major grants, including more than \$2.8 million from CIHR for HIV prevention and care in First Nations and \$2.2 million for the Indigenous Wellness Research Group which works with First Nations and Métis communities across Saskatchewan to support community-based research and health care initiatives;
- Nursing professor Holly Graham was awarded more than \$1 million for a CIHR Indigenous Research Chair in Nursing to build research capacity in Indigenous nursing and improve the health of Indigenous Peoples;
- With the aim of narrowing the health gap between Métis and non-Indigenous people, Kinesiology researcher Heather Foulds has been awarded \$1 million from CIHR to assess the physical, mental, cultural, and social benefits that result from performing traditional Métis social dances;
- College of Medicine researcher Caroline Tait and Indigenous studies professor Simon Lambert lead the new national coordinating centre for the nine Network Environments for Indigenous Health Research (NEIHR) across Canada, with \$1.5 million from the CIHR. The networks foster applied research with community partners and training of community-based-researchers and students, enabling Indigenous peoples to have more control over what and how health research is conducted;
- Tait also leads the Saskatchewan NEIHR – the First Nations and Métis Health Network, based at Station 20 West – with \$3.5 million in funding for five years and the possibility of two five-year renewals, along with support from the Federation of Sovereign Indigenous Nations (FSIN) and Métis Nation-Saskatchewan (MN-S). The network works in close partnership with FSIN, MN-S, the Whitecap Dakota First Nation, and a team of more than 60 researchers and community partners; and
- Agriculture and Bioresources researcher Melissa Arcand was awarded \$250,000 through the New Frontiers in Research Fund to study historic and contemporary agricultural land use on First Nations. The project, *miyo māmawi atoskewin* ('All working together in a good way'), applies both Indigenous knowledge and Western science in collaboration with researchers in soil science, Indigenous studies, and First Nations communities.

### **Synchrotron Sciences**

The *Synchrotron Sciences* signature area has contributed to enormous federal investments over the past decade for the Canadian Light Source, a national research facility of USask, opening up new opportunities for faculty, students, post-doctoral fellows and other technical and professional researchers. The number of USask-affiliated users has more than tripled in a decade – from 99 people in 2009, to 340 in 2019. Current USask synchrotron users include:

- 76 faculty members from a wide variety of disciplines (ranging from Agriculture and Bioresources to Medicine and Veterinary Medicine);
- 40 post-doctoral fellows;
- 27 technical and professional staff; and
- 238 students.

### **One Health**

The *One Health* signature area has contributed to success in many research programs, from sociologist Colleen Dell's Centennial Enhancement Chair in One Health to veterinary researcher Emily Jenkin's work on risks to humans and animals of tapeworms, and has supported research infrastructure investment including the \$140-million level 3 biocontainment facility at VIDO-InterVac opened by former prime minister Stephen Harper in 2011, as well as the provincially funded D-Wing of the Academic Health Sciences Building. Cheryl Waldner is also serving as the NSERC/Beef Cattle Research Council Industrial Research Chair in One Health and Production-Limiting Diseases. Baljit Singh led a \$1.65-million NSERC CREATE grant – the International Training Program in Infectious Disease, Food Safety, and Public Policy – partnering with research groups in Germany and India, providing exciting opportunities for many students.

With the emergence of COVID-19, USask expertise in infectious disease, especially zoonotic disease (infectious disease shared by animals and humans), has resulted in major funding to help fight the pandemic. In 2020 alone, the VIDO-InterVac team was awarded more than \$53 million for vaccine-related research and equipment:

- \$23 million for a “Made-in-Canada Vaccine” and \$12 million for vaccine manufacturing facility from the federal government;
- \$11.6 million to enhance COVID 19 research capacity from CFI;
- \$4.2 million from Innovation Sask.; and
- \$>2.5 million from CIHR.

### **Energy and Mineral Resources**

This signature area was instrumental in creating the International Minerals Innovation Institute (IMII), co-founded by VPR Karen Chad, with funding from mining companies and the provincial government. A \$1.67-million funding agreement with IMII in 2016 led to five new USask mining courses and three new undergraduate mining options in geological, mechanical, and chemical engineering.

The \$8.8-million SSHRC-funded international partnership led by Bram Noble and Greg Poelzer is exploring how northern residents can achieve energy independence and benefit economically and socially through renewable energy.

Industry partners are investing in important energy and mineral resources research, including with Industrial Research Chairs: Tony Chung (NSERC-SaskPower Chair in Power Systems Engineering) and Steven Siciliano (NSERC/Federated Cooperatives Ltd. Industrial Research Chair in In Situ Remediation and Risk Assessment).

Both signature areas Energy and Mineral Resources and One Health were well aligned to attract \$30 million from the Province in 2011 to establish the Sylvia Fedoruk Canadian Centre for Nuclear Innovation Inc. As sole Member of this not-for-profit corporation, USask provided essential leadership for Saskatchewan people to participate among global leaders of nuclear research, development and training, funding research projects, establishing new faculty positions and operating a new nuclear facility - the Saskatchewan Centre for Cyclotron Sciences, which now produces the imaging drug FDG for PET-CT scans in 2500 cancer patients each year.

## Donors and Alumni

By helping to showcase areas of excellence, signature areas also attract investment by donors and alumni. Danielle Dunbar, Associate Vice-President of Advancement points to many investments by donors and alumni, saying, "If we weren't able to show we are leaders in these areas, many of these gifts wouldn't have happened. Any time we can show that we are leaders, it builds trust and builds pride."

A few examples of major donations:

- With a \$5 million donation in 2017, A&W (which had not previously made donations like this) realized that USask was a leader in food security and valued the collaborative approach of the LFCE;
- Hong Kong medical alumnus Patrick Yuen gave \$1 million for graduate student scholarships in food security due to our strength in that area, which he saw was contributing to feeding children around the world;
- Cameco donated \$1.5 million for the Cameco Chair in Indigenous Health, an acknowledgment of USask's signature area focus on *Indigenous Peoples*;
- As zoonotic diseases have received growing attention over the past decade (even before the coronavirus pandemic), USask's excellence in *One Health* research has been increasingly recognized through

**"If we weren't able to show we're leaders in these areas, many of these gifts wouldn't have happened."**

– Danielle Dunbar, AVP of Advancement

government and donor investments. The Bill and Melinda Gates Foundation and the Krembil Foundation are among such donors, funding projects for a single-dose nasal vaccine for newborns, a vaccine adjuvant platform technology, and coronavirus research; and

- USask supporter Cathy Roozen donated \$2.5 million for a cancer-detecting CT scanner at the veterinary college, enhancing *One Health* research on animal and human health.

## Facilitating more partnerships

Partnerships with industry, governments and community are also a source of essential investments in research and innovation. Signature areas have been helpful in this regard as well. As former CEO of Innovation Saskatchewan Jerome Konescni says, "Everybody wants to deal with who they perceive to be the best. Government wants to get the sense that they're getting good bang for their buck."

**"The calibre of talent the university has been able to recruit internationally over the past few years is remarkable."**

– Ryan Wiley, past chair of Research Canada

Konescni recalls a Saskatchewan government research and innovation mission to Israel on which leaders told him: "We can collaborate with MIT, Harvard, or Stanford; why would we want to collaborate with the University of Saskatchewan when we haven't even heard of it?" Being able to explain that *Agriculture* and *Water Security* were signature areas with demonstrable impacts impressed the Israelis and resulted in a visit to campus. "The chief scientist of Israel said, 'This is the only time that we did that with an institution that wasn't an Ivy League university.' Countries have all these other options, and if you can't legitimately present yourself as a global leader, you will not get in the door. And that means missing out on opportunities," Konescni concludes.

A prime example of such an opportunity is the longstanding collaboration between Curtis Pozniak, Director of the Crop Development Centre and USask Agriculture and Bioresources researcher, and Israeli genomics firm NRGene, which has contributed to ground-breaking wheat genome research, and to NRGene's decision to open an office in Saskatchewan to work more closely with USask crop-development scientists.

## Serving as a talent magnet

Our signature areas have helped attract many top faculty, research leaders, staff and students to USask, and these talented individuals have in turn attracted others. Shift Health President and Past Chair of Research Canada, Dr. Ryan Wiley, says, “The calibre of talent the university has been able to recruit internationally over the past few years is remarkable. It’s not to say that you didn’t have good people before – but a relatively small institution in the Prairies of Western Canada is now the place to be for so many world research leaders, who in turn have been able to attract a constellation of people around them, which I think has been enormously uplifting for the university.”

President Stoicheff points to signature areas as key to this, “I don’t think we could recruit as successfully for CRCs, certainly not for CERCs, without the signature areas, and those distinguished researchers have become ambassadors for the university.”

**“I came here because of the signature areas. I was inspired to come to a university whose academic community was proactive in identifying and supporting areas of strength that are important to society and address local and global issues.”**

– Xiaodong Liang, CRC in  
Technology Solutions for Energy Security  
in Remote, Northern, and Indigenous Communities

As well, of the eight NSERC CREATE grants awarded to USask over the last 10 years, five were in the signature areas.

Signature areas have helped USask attract graduate students, particularly international students. *Water Security* offers the most dramatic example: GIWS has recruited 718 graduate students, and 181 post-doctoral fellows, as

**“When I heard about the Indigenous Peoples signature area, I couldn’t think of a better institution around the world to come, because USask was one of the first to highlight this as an area of emphasis and, as a researcher, it meant a lot to me.”**

– Michelle Johnson-Jennings, CRC in  
Indigenous Community Engaged Research

well as 639 research associates and research assistants. GWF has trained over 389 graduate students, 117 post-doctoral fellows, and 166 undergraduate students, working at 60 research sites across Canada.

In the Agriculture signature area, USask’s P2IRC has recruited 109 Canadian graduate students, 68 international graduate students, 15 Canadian post-doctoral fellows, and nine international post-doctoral fellows.

*One Health* involves over 45 researchers from diverse colleges and departments, along with many students and external government and industry partners. A \$1.8-million CIHR-funded Training Grant in Health Research Using Synchrotron Techniques (CIHR-THRUST) program led by Ingrid Pickering has resulted in the mentorship of 96 synchrotron health trainees from five colleges.

Our signature areas have also contributed to a more equitable, diverse, and inclusive research community. According to Lori Bradford, Assistant Professor in the School of Environment and Sustainability, “The implementation of the signature areas allowed for the hiring of international and local experts, and women into positions that enhanced their visibility. This increase in visibility contributed to USask’s multiculturalism, global citizenship, and to our campus diversity. As well, students from all parts of society could see themselves represented in high-profile mentors.”

# REFLECTIONS TO INFORM THE PATH AHEAD

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Over the last decade, USask has experienced a significant intensification and pervasiveness of research activity throughout the university. More of our faculty are significantly engaged in research, scholarly and artistic work. Our graduate student numbers have increased. Our research revenues have increased significantly – revenue that has powered research projects and significantly augmented traditional sources of funding for faculty salaries, student stipends, and infrastructure operating and capital costs. We made new and unprecedented investments in research infrastructure while administrative structures evolved to support the collaborative use of that infrastructure. USask research is achieving greater recognition and having more meaningful impact locally and globally. We have kept pace with other leading research-intensive universities in Canada and, in some instances gained competitive advantage, to the benefit of the communities we serve locally, provincially, nationally and around the world.

While it is impossible to solely attribute research successes of the past decade explicitly as an outcome of the signature areas strategy, there is ample evidence to show that the signature areas shaped the decisions and activities of university leaders, faculty, collaborators and investors in ways that brought an appropriate focus to the work of the university and contributed to our overall success. We now have a bold vision to be the university the world needs. We clearly understand that what we do must be valued by Saskatchewan, but that our reach must extend much further. Ideas, knowledge, capital, and people move freely across global boundaries. In this increasingly connected world, Saskatchewan needs USask more than ever – to attract talent and capital, to interpret and adapt new knowledge from around the world, to generate and preserve knowledge for its own use, and to contribute Saskatchewan discoveries to the global knowledge base and market place. A

research-intensive university our size cannot be all things to all people, hence the imperative to make decisions about where to focus for the greatest local and global impact. This need for focus will not diminish in the years ahead; in fact, the university must continually assess and adjust our focus because the world around us keeps changing and the investments made by others influence where we can continue to make the biggest difference.

## **What has been learned from the processes used to identify, articulate and communicate the signature areas?**

USask followed a highly collegial process to assess our areas of current and emerging research strength and capacity. We looked outward to understand what the community beyond the university expected of us. Signature areas were described in a way that highlighted both the ‘what’ and the ‘why’. Much of the success attributable to our signature areas likely can be traced to this strong methodical foundational engagement and a resolve to be both aspirational and practical at the same time.

A decade later, the signature areas are resonating with the faculty, as evidenced by the high percentage of research proposals that reference one or more signature areas. Funding agencies recognize our signature areas as credible and have readily invested preferentially in signature area research. Collegial, community and peer support for the declaration of the six signature areas assisted university leaders as they made decisions to support and in some ways privilege the signature areas of research. The university has consistently communicated the signature areas internally in strategic plans and externally in videos and stories told about our people and achievements. This emphasis reinforces our resolve and commitment to these areas of research and likely is a factor in the decisions

to award national leadership to USask in critical areas of research of significant importance to Canada.

The rationale for the signature areas will need to be remembered and re-told as research personnel and leadership change. Do these signature areas still resonate with both the internal university community and those that look to the university for leadership through research? How can those among us who may feel less connected to the signature areas become engaged in and proud of the achievements within signature areas? The same collegial and collaborative processes that were used a decade ago to identify signature areas will have to be repeated on a recurring basis to ensure that there is a broad-based ownership of these signature areas.

### **What are the most positive outcomes of naming signature areas and using these in decision making?**

Data matter, and it is unfortunate that we were not able to track detailed information about our signature areas prior to the roll-out of UnivRS in 2016. We need to be deliberate about gathering and sharing relevant data. Measuring, celebrating and connecting accomplishment to vision is important. We need metrics to be able to communicate, to credibly make evidence-based decisions about where to place resources and effort.

Notwithstanding the lack of data, USask has unquestionably demonstrated a high degree of success in attracting talent, research funding, and collaborators and the success is highest within the signature areas. Recruiting top-notch talent is what truly elevates us on the global stage in our signature areas, and then catalyzes recruitment of other remarkable faculty, staff and students. It is highly doubtful USask would have been as successful in many of the national research funding programs (e.g., CFI, CERC, CFREF) and in attracting provincial investments for larger-institutional-level research initiatives (e.g., GIFS, Fedoruk Centre, VIDO, CLS, amongst others) had we not demonstrated the

commitment and agility brought by having clearly articulated and widely promoted signature areas. At the same time that traditional public funding for the University has declined in real dollars, research funding has increased and has enabled investments in faculty, students, and infrastructure that have supported the entire university mandate. USask may look back to this decade and conclude that one of the most positive outcomes of the signature areas strategy was the confidence it gave the university – confidence to expect success in major research competitions, confidence to take up leadership of national and international research teams, confidence to compete for top world talent, and confidence in knowing we can make a difference in the world.

### **What is the relationship between the signature areas and the flagship research institutes?**

USask's flagship research institutes and research chairs have clearly recognizable relationships with one or more signature areas. At the same time, no one research institute or research chair program encompass the totality of this University's activity and capacity within a particular signature area.

How does the university build on the twin strategies – identification of signature areas and the creation of flagship institutes and chairs – to increase its research outcomes and impact? Research institute leaders and chairs can be highly effective ambassadors and spokespersons for a signature area. Indeed, experience indicates that there needs to be visible champions or leaders for each signature area. At the same time, every professor and scientist should be able to associate with a signature area, and be acknowledged for doing so, even if they are not attached in any way to one of the flagship institutes.

## Are our six signature areas still the most relevant?

Each of our six signature areas speaks to our sense of place which may give them a certain longevity. Three of the signature areas (*Agriculture, Water Security, Energy and Mineral Resources*) reflect directly on our province's natural resource assets. It is logical that the rest of world would look to Saskatchewan for innovation in resource management, as it has formidable capacity and competencies in these areas. Increasingly these three signature areas are considered as related aspects within a water-food-energy nexus. The *One Health* signature area draws on USask's exceptional breadth of expertise at the intersection of human, animal and environmental health: there appears to be considerable additional growth and scope for both disciplinary and interdisciplinary research within this signature area. The *Indigenous Peoples* signature area, perhaps more than the others, is an aspirational goal, to honour our commitment to Indigenization, to the scholarship of Indigenous Peoples, and for inclusion of Indigenous knowledges and ways of knowing across all areas of research, scholarly and artistic work. A sixth signature area (*Synchrotron Sciences*) was at the time of declaration also an aspirational goal, intended to grow from the advantage of in-community infrastructure for imaging technologies and of an ample set of important areas for application of synchrotron science across natural resources and health.

The most highly developed and heavily invested among the signature areas are in *Water Security, Agriculture and Synchrotron Sciences*. The other three appear to be just as important today, if not even more so, than they were a decade ago. Going forward, USask will want to assess how to bring the necessary focus and coherence to further uplift these areas of research. The *Energy and Mineral Resources* signature area requires special attention; for a variety of reasons, this area, while important to our institution and province, has not yet resulted in a coherent and visible interdisciplinary cluster of researchers. We may also want to review the specific way that each signature area is articulated, both the "why"

and "what" to ensure that they accurately portray our capacity, competencies and aspirations.

It is possible that our collaborators, investors and beneficiaries expect USask to bring scholarly focus to some additional broad areas of research that are not captured within the current six signature areas or in the intersections among them.

Signature areas are not written in stone and, over time, other areas may become strong and worthy of recognition as a signature area of research. Faculty may choose to apply for funding and engage in research that has no overt relationship to the signature areas. We are continuously conscious of opportunities to invest in and provide institutional support for new areas of emerging strength and individuals where there is evidence or promise of collaboration and excellence. According to former president, Peter MacKinnon, "They were never viewed as a closed and final category, nor could they ever be because universities evolve like all institutions, and things change, but it was important to set the example, and hopefully attract the kind of attention and capacity that would lead to more areas of pre-eminence."

## How can the university gain even greater advantage from the signature areas strategy?

While there is ample evidence that the decision to name and embrace signature areas has positively lifted our achievements and reputation, opportunities for further leveraging are apparent. Academic programming, for instance, has not been particularly influenced signature areas of research. Learning and discovery are understood to be inexorably intertwined in a research-intensive university and one might expect more significant evolution of academic programs to reflect the research strengths of the university and to help define the distinctiveness of USask as a destination for prospective students.

While policy and societal implications are conceptually part of every signature research area, the current reality is that engagement by social scientists and humanities scholars is uneven and sub-optimal across our signature areas. Insufficient numbers of these scholars strongly identify with a signature area and their research and their involvement is often compartmentalized or not invited until after research has been conceptualized and funded. Fostering greater involvement of social sciences and humanities will strengthen our signature areas research by ensuring a multitude of ways of knowing are brought to the research aligned with the signature areas. Involving the social sciences and humanities in integral ways is foundational to the type of impact that the signature areas seek.

Naming, supporting and prioritizing signature area research is expected to lead to research with higher impact and international recognition. There undoubtedly is scope within each of the signature areas for higher achievement. There could be areas of research where focusing more resources for a longer period of time within a focused area of discovery might lend critical mass of intellect and resources and the ability to support the research with specialized

infrastructure, which could result in Nobel-prize worthy discoveries. Some of the world's most significant challenges require multi-disciplinary research groups that coalesce to ask better research questions: To truly take advantage of interdisciplinary research framed within a signature area will require us to examine and modify the ways that we measure and reward scholarly accomplishments. In some areas of discovery, researchers in foundational and applied science might be linked more purposefully within the innovation pipeline to accelerate the movement of ideas through basic discovery to application, whether in commercial enterprises or in public policy.

As President Stoicheff says, "It will be incumbent upon us to continue with the culture of identifying what it is we are truly good at and unique at so that we can attract global attention. Post-pandemic, we will be in an even more globally competitive university market, and there are universities that will not do well in that environment. We will now have to say, "Given that you as a graduate student or post-doc can connect with any university in the world, why do you want to connect with us?" That will be a question we will need to answer better than ever in a post-pandemic world."

**"USask has witnessed an unprecedented period of growth, success and heightened pre-eminence as one of Canada's leading centres of learning and discovery. This progress was not coincidental. It required a compelling vision, a clear strategy and plan, leadership and focus, and a lot of hard work by talented people throughout the university who are committed to be the best we can be.**

**"The bold decision to adopt signature areas played a crucial role in our transformation over the past decade and has positioned USask well for the decade to come – another decade of delivering discovery the world needs."**

– Karen Chad, Vice-President Research