



An exploration of client benefits

**Bergeron Centre for
Engineering Excellence
York University**

**ZAS Architects+
Interiors**

About

BuildingsThatWork facilitates a Client + Architect exploration of why buildings matter. We document best practices of institutional building design and the impact on key stakeholders.

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Bergeron Centre for Engineering Excellence at York University

Project Details

Location: Toronto, Canada

Open: September 2015

New construction, 170,000 ft²,
5 storey facility

Client: York University
Campus Services and
Business Operations,
Lassonde School of
Engineering

Architect:

ZAS Architects + Interiors
Paul Stevens,
Principal in Charge – Architect
Costas Catsaros,
Project Architect

ZAS Architects + Interiors

Introduction

The Lassonde School of Engineering's desire to create an engineering school like no other is realized in the new Bergeron Centre for Engineering Excellence. This beautiful building on the campus of York University voices an ambitious mandate: to create the home of the Renaissance Engineer where students are free to explore their passions and gain different perspectives from the world around them. Renaissance Engineers think in big systems not little silos, design with people in mind and embrace ambiguity. After an involved and collaborative design process, this world class facility expresses new pedagogies of a new "landscape of learning" that is visually and physically connected back to the building's campus surroundings and supports every aspect of learning and student life.

Benefits

Interviews with University Executives, students and ZAS Architects + Interiors reveal the design process and the successful delivery of the following client benefits:

- / A statement building that differentiates Lassonde from other engineering schools.
- / Enrolment has exceeded expectations and will translate into increased attraction and retention of students, faculty and staff. The Bergeron Centre will undoubtedly be viewed as a world class facility.
- / Supports an ambitious Renaissance Engineering vision that celebrates the principles of class, style and substance. Innovative design thinking has optimized the building for active learning, interaction and innovation.
- / Students feel valued, welcomed and productive in a student-centric environment where their spaces are the priority of the design.
- / Triangulated glass panels form a shimmering "cloud" facade – inspiring limitless blue sky thinking, reflective of Renaissance principles of innovation and breaking from convention.
- / Exceptional project and construction management utilizing 3D Building Information Modelling (BIM) allowed for delivery of an impressive and complex building on a tight, inflexible timeline.

Perspectives

“The Bergeron Centre reflects York University’s aspiration to provide facilities that make an impact on a grand scale—bold architecture, smart classrooms, and dynamic community spaces.”

– Mamdouh Shoukri

At York we have a strong commitment to focus on new programs across the University which emphasize our historic strengths in interdisciplinary education and research. One of the most exciting things happening on campus this fall is the opening of the Bergeron Centre for Engineering Excellence, the vibrant new home of the Lassonde School of Engineering. This truly iconic new building offers a welcoming new space for the next generation of innovators on campus.

Our primary objective for the design of the Bergeron Centre of Excellence was to create a space that is perfectly in step with our bold vision for the Lassonde School of Engineering—a facility whose design would support and augment the training of the next generation of engineers and advance the new frontiers in engineering education.

We also wanted a building that reflects our commitment to use resources wisely and effectively. Its design is not only visually striking, but also features space utilization that is as efficient as any building that can be found in the City of Toronto. It is a building that helps people work and works with and for them.

My favourite thing about the building is that its open spaces facilitate experiential and technology-enhanced learning. I find that every time one enters the building, it uplifts the spirit.

The Bergeron Centre reflects York University’s aspiration to provide facilities that make an impact on a grand scale—bold architecture, smart classrooms, and dynamic community spaces.

Today, with the support of visionary investments by Pierre Lassonde and Doug and Sandra Bergeron, we are creating the most imaginative and innovative engineering school in Canada, housed in a building that perfectly embodies that aim.

Mamdouh Shoukri
*President and
Vice-Chancellor*

York University



“We have created such an extraordinary space for our students that they have asked to have 24-hour access to the building.”

– Janusz Kozinski

The foundation for the Bergeron Centre’s design was grounded in the key principle of the new Lassonde School: to develop a Renaissance Engineering curriculum that had a more holistic and humane academic program than other engineering schools. It was to be a hub for entrepreneurship, collaboration and creativity with a focus on learning rather than teaching.

We issued ourselves the “50/50 challenge” to become the first engineering school in Canada to achieve gender balance. We felt the renaissance engineering curriculum would create more opportunities for women so it was important to create a bold building that fostered a Renaissance-like spirit and showcased universally appealing principles of class, substance and style.

We also believe whole-heartedly in the maxim of “students first.” From its inception, the Bergeron Centre was envisioned as a student-centric building. We started by asking, ‘What is it that a student would want from the program?’ and designed for this journey—without walls, without classrooms—and ZAS had to build an infrastructure to support this. To ensure our students learn to respect quality and to optimize their potential for achieving great things, we used high-end furniture and finishes and provided the best technical resources. The result is a mix of charm, elegance and practical functionality that appeals to everyone.

A different program needs to be delivered differently so the space has been designed to “flip the classroom” and

maximize natural interactions among its occupants. I am proud to say we have zero lecture halls. We want students to focus on solving problems together with professors in small groups. It’s a much more dynamic environment and one that young people like and learn best in. The Design Commons, with its flexible large and small group work areas, is one of the building’s finest pieces of real estate and is constantly occupied.

We flipped the building, giving the best spaces to our students. Faculty offices are located in the centre of the building and social spaces, labs and classrooms along outside walls to maximize natural light and provide inspiring views. This approach not only keeps students focused, alert and happy, it encourages professors to go outside their offices and interact with students. It is working perfectly and as intended. We have spaces to exchange knowledge in a way that is so organic and natural we don’t even feel it. It’s a terrific thing for staff.

Bergeron is now open—and the enrolment numbers are through the roof. We’ve been stunningly successful in attracting a wide variety of student candidates at York University because of this building.

Janusz Kozinski
Founding Dean

Lassonde School of Engineering



“It was such a thrill to have the opportunity to work on this building. How often do we have the chance to leave that kind of a legacy behind?”

– Richard Francki

What does a new faculty of engineering mean? It means good academic programs but it also means a signature building. We asked ourselves, what statement can we make with this building that will attract the next crop of young engineering students? The building had to be recognizable, eye-catching and something that York University would be proud to put in its promotional literature and on its websites in order to attract the best people.

Turning the classroom inside out was a revolution in how you teach and in building science—how do you lay out a building to teach a new concept when the concept itself is not necessarily that well understood? We all know how to build square classrooms and put tables and chairs into them and maybe even a data connection and a projector. But we wanted IT-rich rooms that aren't used for conventional lecturing but for interactive problem solving by the students. Even our budget models for designing buildings are based on conventional design. We worked closely with the users, future faculty and ZAS to define the program and, through that process, the external appearance crystallized into the beautiful expression of an idea.

One of the greatest successes of the project was the ability to plan, design and construct an extremely technical and striking building under a short and inflexible timeline. We launched the Lassonde School building project in 2012 with staggered enrolment over 2 years and the building followed in 2015.

We originally accommodated students elsewhere on campus but by 2015 we had to have the building ready to accommodate 3 years enrolment of students and the accompanying tuition dollars flowing in to the campus.

Various trades had to work in lockstep and collaboratively to make this technically complex building happen. We used 3D building information modelling, cradle to grave, and it delivered real benefits: the rapidity of execution and the reduction of construction clashes and change orders during design. At the end of the design process we have an invaluable digital model we can use for maintenance and future alterations.

It took careful thought by both ZAS and the construction manager to ensure we didn't jeopardize the timely completion of the building. I didn't think we would be able to create something as beautiful, functional and elegant as we did with the design team but I am delighted by its success.

Richard Francki
Assistant Vice-President

Campus Services and Business Operations



“Students have responded exceedingly well to open light filled spaces like the Design Commons, with its prototyping areas and 3-D printers. This design studio is a working collaborative space that is robust, flexible and designed to patina gracefully over time.”

– Paul Stevens

We immediately recognized that this building would be occupying a very prominent location for the Lassonde School, as well as the entire University. On what was once a parking lot, the design team saw an opportunity to create a building that would act as a gateway link to the entire campus. We took advantage of the natural conservation area and panoramic distant views of Toronto to create a “Landscape for Learning.” Within this landscape there are many places for students to learn and socialize around its terraced edges. This provides a sculpted platform to the building we refer to as “The Rock” – the metaphorical base and anchoring element. Many of the civil engineering classes are located along this grade level and open up on to a south facing, multi-use courtyard, that is also capable of being an outdoor classroom set within a bucolic location.

From the outset, there was an opportunity to do something totally different from the other mainly rectangular buildings on York’s campus and to create something that would further support the Lassonde vision of a Renaissance curriculum. Bergeron’s cloud-like architecture is founded upon blue sky thinking and limitless creativity; yet the ‘whimsy’ of the abstract facade is grounded in a mathematical, triangle-based algorithm. It creates a drifting cloud-like form with changing light and patterns that are reflected in the interior spaces. The triangular patterns act like a “word mark”

throughout the building whether it be the windows, ceilings or walls.

The Dean and his staff were insistent that students at Lassonde come first and should feel it is their building – not the faculty’s, or even York’s. As a result, academic services and student clubs are strategically located at the main entrance. The best panoramic views and social spaces are on the main level where students gather. This student-centric philosophy percolates through the building to the labs and classrooms; even corridors become places to learn, create and collaborate with small niches, banquettes and whiteboards throughout. The open layout echoes the look and feel of start-up businesses that often begin in flexible, raw spaces. The entrepreneurial spirit is one of the objectives of the program and one we wished to reflect in the building itself.

In a very short time the school is seeing the intended results – it attracts students who are not even in the program because it is such a wonderful place to study and socialize. The building itself is fostering interaction and collaboration among students from different faculties – all happening naturally due to thoughtful design and an inspiring Renaissance vision. The results of those interactions are felt on a daily basis and one is left with the feeling that interesting, creative work is at play here in their new home.

Paul Stevens
Senior Principal

ZAS Architects + Interiors



“BIM modelling and a strong adherence to interdisciplinary collaboration allowed us to deliver this building on time, on budget and confident of its technical and aesthetic integrity.”

– Costas Catsaros

When we began this project, the Lassonde School’s programming had yet to be established. Without a full team of faculty and technicians in place to consult, we worked closely and intensely with the available York team to develop the program and the building to accommodate it. Though a tremendous challenge, the outcome was a design that was well thought out, vetted and accepted. However, given the aggressive schedule and its immovable end date for occupancy, a short 20-month construction period remained to realize a very unique building. We had to be collaborative, responsive and find as many ways as possible to speed up construction without compromising design.

Building information modelling (BIM) was fundamental to our ability to deliver the design’s complex forms and intricate systems. The vast majority of the components and systems that make up the overall building were created in a 3-dimensional BIM environment. This streamlined many aspects of the project’s management, and in passing the various design models onto many of the sub-trades, it allowed for expedited shop drawing production as well as substantial off-site prefabrication. This allowed the team to leverage the notion of ‘just-in-time’ and ‘plug and play’ construction in order to minimize onsite downtimes. In the end, we believe we have delivered to our Client one of the most detailed and complete BIM models ever produced for a post-secondary building.

A perfect example of the power of BIM emerged with the overall assembly that makes up the cloud façade. The envelope’s geometric complexity notwithstanding, the importance of getting the building enclosed and weatherproof was paramount if the schedule was to be met. Through the creation of a design model with a high degree of detail and technical resolution, the façade steel fabricator and various envelope trades were able to successfully adopt a unique method of progressing the model technically for each of their needs and sharing important information such as tolerances and set-out points with each other. The result was a very rapid install process for those that used the model. Interestingly, a spin-off effect was noticed whereby other trades who had not used the model, were also able to speed up their installations due to the rapid progression and availability of areas to work on.

The tradespeople felt such pride in this project that the last aluminum composite cladding panel installed bears the signatures of all of the tradespeople, construction managers and consultants involved. Only a few people know where it’s located, but this act clearly speaks to the success that technology and collaboration can realize!

Costas Catsaros
Associate

ZAS Architects + Interiors





Tetiana Situigina
2nd Yr, Space Engineering,
Lassonde Scholar



Cameron Boyce
2nd Yr Electrical Engineering,
Lassonde Scholar

I really feel the building has been designed to feel open and focused on the students. The academic services are located at the entrance and the Dean's office has glass walls so you can see whatever is going on. I feel welcomed and the space has been designed to be more open and make them more accessible.

The student spaces are on the outer edges of the building with lots of light and views and staff offices are in the middle of the building. Usually schools give the best spaces to the faculty so this feels like we are a priority. There are white boards everywhere; people put inspirational words or jokes or write down problems on them, and this makes me think of things outside of what is just logical or what you can put in a formula because everything is mixed in together, just like life.

The furniture is amazing and there are cool places to relax and do work. I especially like the wooden floors in the Design Commons. To be surrounded by all of these nice things makes me feel like they built it just for us—they put in everything we need to do our studies so we feel at home and valued. It has been designed to be open and social and there is always somebody here I know. You are never alone.

I feel this building is going to help bring in a lot of new students and be a great thing for our school. It is a beautiful building and even the triangle shaped glass in the design suits the engineering program. It does look like a cloud. It's really magical.

“The school feels open to everyone. The design makes the space and therefore the program seem less intimidating which I think is important, especially for female students.”

When I think of Renaissance Engineering I think of the culture of being socially conscious and well rounded. The building leaves so much space for student clubs, from Engineers Without Borders to Salsa Club and it's all mixed in with the academic elements of your learning. It's a chance to see something new or differently - and this provides the opportunity to be more well-rounded and absorbed in a diverse Renaissance approach.

There is so much open space and white boards are everywhere for collaborative learning. It's much more fun to be here than stuck in a library working by yourself. It's like the space helps me learn. For instance, there are no lecture halls. The group desks are decked out with all of the technology associated with that program. Because of that design, you really get the message that they are offering more one-on-one attention with the instructors. That is really important because, having sat in lecture tutorials, it is really easy to disengage.

Upstairs there is an area that feels like an upscale condo and study rooms. You look for and appreciate those comfortable areas because you spend so much of your time outside of your classes with people in your program doing homework and solving problems.

The best part is it just looks cool and interesting. Any engineering student would be excited to see it and want to go inside and explore. It looks smooth and sleek and, looking up from the pond, especially at night, gives quite an impression. It makes us proud of our building and to call it home. Everyone can appreciate the thought that went into it—especially as engineers.

“It's a complete package—the big and little things create the atmosphere you want as a student. It's hard to find anything that shouldn't be here. They've done it right.”



ABOVE: The Bergeron Centre transforms a former parking lot at the back side of the campus into a stunning new gateway to the University; connecting students to an inspiring "landscape of learning." The signature building reflects Lassonde's Renaissance engineering mandate promoting style and substance. *"The 'cloud' and 'rock' imply the boundless and limitless potential of creativity and innovation that is grounded in engineering and science."*

Paul Stevens



TOP: The intricate facade is based on a mathematical algorithm that translates the ever changing nature of a cloud into architecture. At night, student spaces are spotlighted, drawing passersby into the dynamic activity of the school and further encourages students to look at things differently. *"The windows telegraph into the rooms so when you're sitting inside of the building you are looking through these odd shaped windows and it's quite an extraordinary way to view the outside world"* **Richard Francki**

BOTTOM: The Design Commons occupies a prime location with lots of light and a variety of views. Students use larger work areas for group meetings, small project rooms to discuss issues and a prototyping area to design on 3D printers. Everything they need is in one suite of rooms that open onto each other. It's a fluid and flexible place to work



TOP: Niches and banquettes optimize the space where corridors intersect. Students and staff can pause to have spontaneous interactions, work or socialize. This allowance for more flexibility of use shows that every space is a learning space.

BOTTOM: "The curriculum is delivered in non-traditional Active Learning Classrooms that provide the necessary technical resources and accommodate different types of learning. It is an immersive and interactive environment that is not about regimented curriculum delivery but about group learning and problem solving" **Costas Catsaros**

This irregular feature staircase at the centre of the building is a strategic connection between student and academic services. The Design Commons is located next to Administration at the top of the stairs. *"We wanted to demystify the Office of the Dean so when students go to the Design Commons they would always pass by the Dean's office. It allows a natural interaction between administrators and students."*

Janusz Kozinski



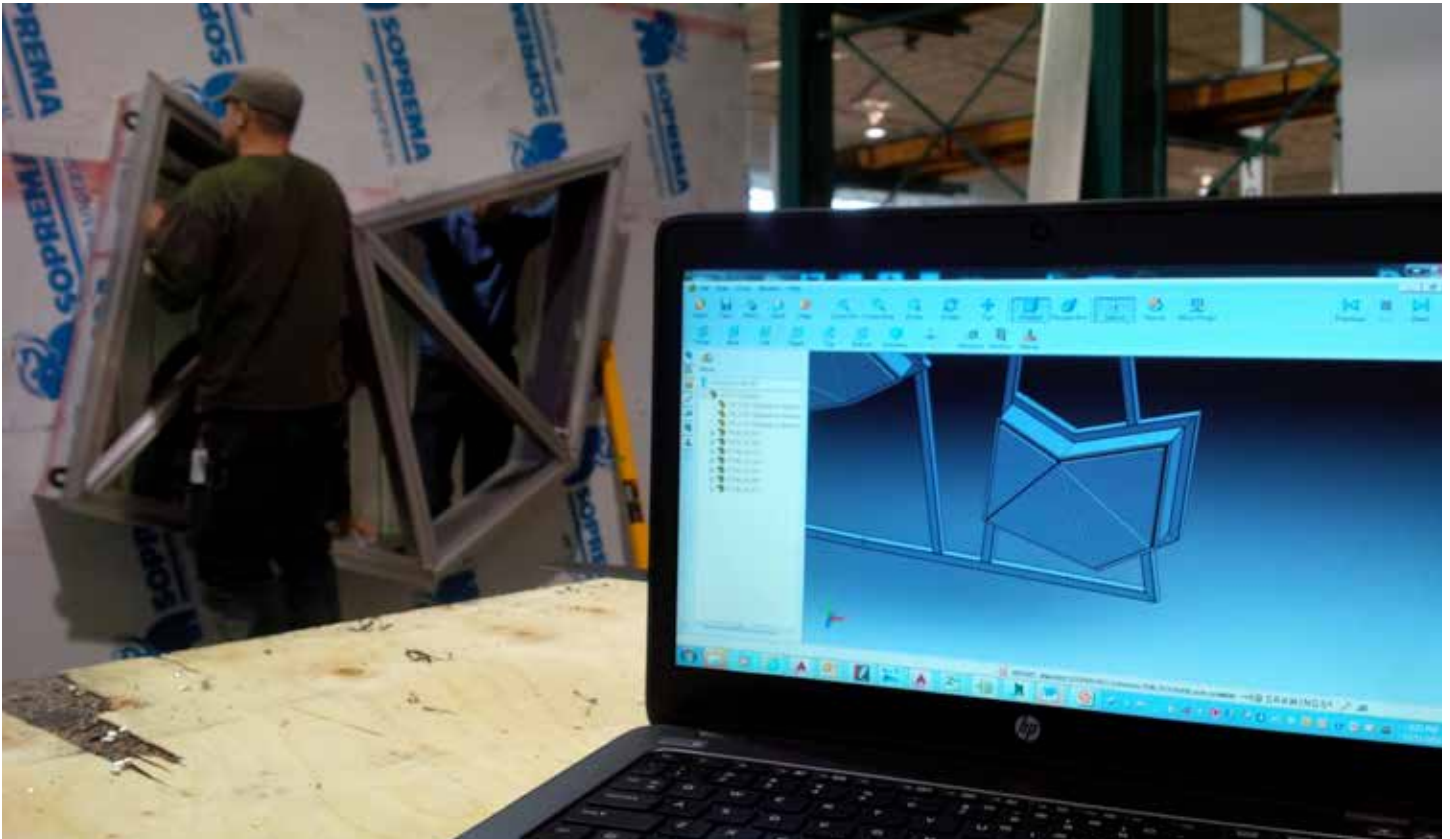


TOP: The Event Space is the social heart of the building. Its premium location reflects the Lassonde mandate of "students first". Students stay energized in the light of this south-facing area with panoramic views of Stong Pond and the city beyond, serviced by a cafe with tables and banquettes on which to work, relax or hang out. *"It is always busy with people finishing assignments. It's a very dynamic active space."* **Cameron Boyce**

ABOVE: Student Services is located at the main entrance for easy and direct access. The backlit triangular forms on the ceiling reference the exterior cloud façade, demonstrating that along with the high end finishes, splashes of colour, classic furnishings and technology-enabled work areas, the school's credo of "style and substance" is realized.



Civil engineering students get to “test to destruction” in the massive, 3-storey High Bay Lab. The 1 metre thick strong floor and 1.5 metre thick reaction wall contain an enormous capacity for learning and creativity. Unlike other engineering schools, Lassonde’s High Bay is located centrally within the building’s footprint. Designed as a “building within a building”, the rest of Bergeron is protected from the vibration, noise and dust inherent to this unique raw space.



TOP: Labs are light-filled spaces connected to exterior walls and not buried in dark basements. Students benefit from the natural light which augments learning so they perform better. Durable and neutral finishes mix with stylish and colourful furnishings to reflect the “youthful spirit” of the program, even in the most serious of research labs.

ABOVE: Leading-edge use of BIM from the outset allowed architects, engineers and the builders to work efficiently as a holistic team. Designing the building in a 3D environment that was then transferred to the construction manager and sub-trades afforded a tremendous amount of work-flow efficiency and schedule savings.

Contributors

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