ANNUAL REPORT: CHAIRS IN DESIGN ENGINEERING[1]

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Please verify your personal information below and make the necessary corrections.

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Chair in Design Engineering Name: « NSERC- chair in design for aluminum (DFAl) »
File No: 411611 - 08
Contact person, Partner name, J.D. Laprise, CQRDA
F. Racine, Alcoa Canada ltée
D. Larouche, REGAL Regroupement Aluminium

Top 3 contributions for the year.

1. To propose a Product Development Process (PDP), from prototype to product: Two Ph.D. students (Celette, Iorga) working upstream and downstream on the subject.
2. To experiment high diversity, collaborative design in product development: An aluminum cauldron for the 2013 Canada Games.
3. To establish a graduate student PDP: Experiences drawn from large industrial projects at the Centre de technologies avancées BRP – Université de Sherbrooke.

Best Practices

Please share one best practice that was implemented to be shared with other CDE Chairholders.

Maximizing the Chair visibility both internally and externally.

In order to foster links most effectively between students and companies through capstone and graduate projects, both groups need to be keenly aware of what the Chair can bring to them.
At the student level, the Chair can bring resources such as industrial project propositions, access to knowledge on aluminum use, aluminum friendly assembly tools, free aluminum for their prototypes and financial support from the CQRDA, a Chair partner. Hence, to get student to know about all this, presentations were made in courses IMC156, IMC610, IMC900, IMC916 and IMC917. From there, it is simply impossible that a mechanical engineering student at the Université de Sherbrooke would not know about the Design Chair. At the industry level, the Chair can also bring resources in the form of expertise in driving design projects, both at the undergraduate and graduate levels with varying degrees of government support and intellectual properties ownership. Again, to inform industries about these possibilities, presentations upon invitations were made in Montréal, Saguenay, Sept-Îles, Trois-Rivières and Longueuil in the past year. In the end, the Chair mandate accomplishment is somehow tied to both students and industries taking advantage of what the Chair has to offer.

1. Overview

a. Chair Structure

Please provide an overview of the participation in and contributions to the CDE action plan of each member of the Chair's team (Chairholder(s), professional staff, company experts, collaborators, post-doctoral fellows, students, etc.).

- *Senior Chair : Prof. Alain Desrochers, P. eng., Université de Sherbrooke, Canada.*

All reported Chair activities have so far been conducted by the senior Chair, with the help of a Chair professional. The regular staff from the Department of Mechanical Engineering (DME) also played an important role in terms of capstone project supervision and support.

- *Industrial co-Chair : Russel Long, P. eng., Chief Design Engineer, Alcoa Technical Center*

Mr. Russel Long played an important role in disseminating aluminum knowledge on vehicle weight reduction. On this topic, Mr Long prepared a 45 minutes multi-site webinar that he delivered to a class of 40 students with industrials attending the presentation remotely.

b. 5 Year Term Objectives Overview

Please provide a brief overview of your Chair, its goals and objectives.

The objectives of the Chair in Design for aluminum are twofold :

1. To evaluate and integrate the strategic use of aluminum in products from a cost/benefit/performance perspective;
2. To develop and disseminate knowledge and expertise on product design, rather than prototypes, where reliability, manufacturing and assembly processes will be assessed.

c. Annual Objectives/Tasks

Please provide a list of the activities that were to be achieved in the past year and your progress toward these objectives.

Chair program : (Achievements, since May 2012 report)

1. Undergraduate training - Applying Knowledge in Aluminum Design (Mech. and Civil Engineering)
   - Gathering information & knowledge on aluminum and reliable product design.
     - ⇨ *Reference books such as the "2010 Aluminium Design Manual" were identified by Mr Russel Long, and purchased by the Chair. Other valuable references from the NASA, among others, were also collected by graduate students.*
   - Developing courses on aluminum in engineering.
     - ⇨ *In the last year a partnership was initiated with the Centre de Metallurgie du Québec (CMQ) a technological transfer collegiate center affiliated to the Trois-Rivières College. The first common action undertaken was to offer an introductory level course entitled "Aluminum and its alloys". The course was scheduled to be offered at the Université de Sherbrooke Campus in Longueuil as a two days seminar in the winter 2013 semester, but has been postponed due to a lack of participants.*
   - Supporting aluminum usage in undergraduate capstone design projects.
     - ⇨ *In 2012, the chair has been able to respond to demand for aluminum from capstone project teams, in terms of quantity, shape and grade. This represents an almost*

3000$ expenditure in aluminum.

- Industrial project definition and identification

⇨ *Since September 2012, the Chair professional has been working in close collaboration with the SARIC (Service d'appui à la recherche, la création et l'innovation) towards getting capstone projects agreements signed with the industrial partners. These include financial as well as intellectual property issues. As a result, the Chair is not only involved downstream at the manufacturing and final exhibition stages of the capstone projects, but also upstream when the capstone projects and the partnership agreements with the industrials are drafted.*

⇨ *The Chair and its professional remained committed in contacting companies and finding new capstone projects in a proactive way. Over the past few months, the Chair attended several industrial fairs and met with many companies some of which were keen to offer and sponsor new capstone projects:*

- *A project on the design of a new family of compact and lightweight winch systems has been proposed by POSI+, a manufacturer of cradle elevators trucks that are mainly used by cable and electricity companies. The project has been selected by the students in January 2012.*
- *A Valcourt based company called Verbom has unsuccessfully proposed a project on the design of an aluminum camping trailer constructed of blow molded structural aluminum sheets. Verbom's project will be submitted again to the undergraduate students at the fall 2013 semester but the Chair is also considering the idea of turning this project into a master level degree one.*
- *Drakkar International, a start-up company, has proposed a capstone project on the design of a new generation of aluminum supermarket shopping carts. Unfortunately, it has not yet been selected by students.*

- Capstone projects (fabrication and exhibition)

⇨ *In the fall semester, the Chair is fully committed to giving students support at the prototype fabrication phase by providing appropriate tools and advices including those teams not using aluminum. The Chair professional helps students make sound fabrication choices and identify external suppliers when needed.*

⇨ *At the end of the fall semester, the yearly Mecageniale public exhibition features all undergraduate newly created prototypes from mechanical engineering. The Chair professional is deeply involved in the logistic and the organisation of this exhibition which displays 10 to 12 prototypes designed and fabricated by the students themselves. Indeed, year after year, the Mecageniale exhibition attracts hundreds of visitors and has grown to a point that it is now covered on an annual basis by the regional media. Groups of kids from primary schools tour the exhibition under the guidance of students who are always pleased to discuss their prototypes.*

2. Graduate and post-graduate training - Creative Design for Innovative Aluminum Products

- Development of methodologies and advanced design tools;

⇨ *The underlying philosophy of the Chair is to go from prototype to product, hence integrating product validation, manufacturing assessment and reliability evaluation in the Product Development Process (PDP) (first among the top 3 contributions for the year). To that end, one graduate student, Cristian Iorga has just submitted his own thesis whose title could translate as: "Development of Design and Validation Methodologies for Products and Structural Components Development". Tellingly, the process Cristian followed doing his work highlights the synergy between the Design Chair and the Centre de technologies avancées BRP (Bombardier Recreational Products) – Université de Sherbrooke (CTA) were the PDP validation stage took place in the last two years of the Ph.D. work. More specifically, Cristian worked alongside*

with three other master degree students on the development of a lightweight frame (chassis) for a three wheel, hybrid CanAm Spyder roadster. The outcome was an optimized frame and a validated PDP supported by a comprehensive case study (which will unfortunately remain confidential for now).

- ⇨ *As a corollary to the previous point, a new graduate student PDP is emerging from the collaboration between the Chair and the CTA (third contribution among top 3 for the year). Indeed, students follow a specific Research and Development methodology that combines academic and industrial requirements in a very structured and novel way. Hence, innovation based research toward prototype design is done alongside incremental based development toward reliable products. In this new paradigm, the students are being supervised not only by one or two professors but also by a project manager from BRP. Among the deliverables the students are being held accountable for, are the production of a memoir (or thesis), if possible, one conference paper, participation in the design and production of an industrial prototype and formulation of a corresponding design methodology. From a graduate study methodology standpoint, the project will generally be split in four distinct phases: 1) Development of an analytical or digital predictive model, 2) Validation of the model on an existing reference product (usually a vehicle), 3) Application of the validated model toward the improvement of the reference vehicle or the development of a new one and 4) Delivery of a design methodology making use of the developed model. This successful approach is now being formalized and is becoming a "trademark" of the projects undertaken at CTA.*

- Development of innovative products and materials.
  - ⇨ *The chair is very happy to announce that is has launched an R&D project in collaboration with a company called MC2 Recherche Internationale. An international student was recruited and was granted a BMP Innovation scholarship at the Ph.D. degree level. The objective of the project is to design a state of the art submerged turbine that will harness the power of rivers to produce electricity.*

3. Chair resources
   - ⇨ *In addition to the Chair professional/mechanical engineer hired in 2011, the Chair has also hired an intern, Jean-François Dufault, whose mandate is to develop pedagogical material for a course on design using aluminum.*
4. Other Chair matter / projects
   - ⇨ *In the past year, a team of students from different horizon has been assembled to tackle a unique multidisciplinary project aiming at conceiving and fabricating a cauldron for the Canada Games to be held in Sherbrooke in 2013. Teaming up in the project with their specific competencies were three local secondary and post-secondary institutions: Bishop's University Department of Fine Arts for the artistic design, Université de Sherbrooke for the engineering and process planning and the Lennoxville Vocational Training Centre (LVTC) for the fabrication and assembly of the artwork. The collaborative aspect of the project was the main driver and the topic of an investigation which led to a paper at the 2013 Canadian Engineering Education Association Conference. The cauldron will be used for the next ten Canada Games, therefore becoming a legacy and insuring the continuity and the visibility of the symbol it is representing. The realisation of this artwork has been made possible, thanks to the support of the Canada Games Council and the Aluminum Association of Canada, both providing a total of 41 500$ in cash for the project. Coordination of the project, however, proved to be very time intensive for the Chair professional.*

d. <u>Objectives/Tasks for Upcoming year</u>

Please provide a list of the activities that you are planning for the upcoming year.

Chair program :

1. Undergraduate training - Applying Knowledge in Aluminum Design (Mech. and Civil Engineering)
   - Developing courses on aluminum in engineering and product optimization and validation;
   - ⇨ *Three professors from the department of Mechanical Engineering plan to set up a new course entitled: " Modern structural materials for the transportation industry". A preliminary work plan was drafted. The first section of the course will discuss the properties of aluminium and its alloys as well as composite materials. The second part of the course will address stress and fatigue induced failure on structural material when submitted to fluctuating load cases. Finally, the third part of the course will address multi-material assembly techniques such as riveting, welding and adhesive bonding. As previously mentioned, a mechanical engineering intern was hired to be totally dedicated to the development of case studies and learning material on aluminum product design. Alcoa is also expected to play a role in this endeavour by providing aluminum usage case studies and examples.*
   - Setting up an assembly workshop for aluminum related students projects
   - ⇨ *It is expected that a waterjet equipment will be purchased in the coming months as to enable our students to cut aluminum, steel, composites and plastic sheet material. Several discussions have already taken place with the various manufacturers of waterjet equipment. A total budget ranging between 150 K$ and 200 K$ has been planned with 50K$ from the engineering faculty and the department of mechanical engineering. The technical bidding document with the waterjet specifications is to be prepared at the time this report is being written. The bidding process, machine delivery and installation should all be completed by the end of 2013. This will be the biggest purchase of the Chair in its 5 years mandate.*
   - ⇨ *Apart from the above equipment, two other useful machines for the student assembly workshop have also been identified: a press brake for sheet metal bending and a tube bender for vehicle frames. It is still unsure yet as to know whether enough funds would be available to buy CNC machines. Otherwise, an entry level semi-automated tube bender would cost approximately 25K$ whereas a hydraulically or electrically actuated press brake, would require an additional 35K$ to 50K$. The purchase of used equipment might also be considered at this point.*
   - Supporting aluminum usage in undergraduate capstone design projects.
   - ⇨ *Supporting capstone projects will be a continuous undertaking throughout the full five years of the Design Chair. Hence, aluminum will continue to be provided to the students who need some and new projects will be sought on an ongoing basis.*
2. Graduate and post-graduate training - Creative Design for Innovative Aluminum Products
   - Development of methodologies and advanced design tools;
   - ⇨ *As mentioned earlier, the first among the top 3 contributions for the year pointed to the development of a PDP from prototype to product. A downstream adaptation referred to Cristian Iorga's work on the integration of a validation methodology within the detailed design phase. At the upstream end of the design process, Caroline Celette has started a Ph.D. on the design of a submerged river turbine whose design methodology will innovate, extending the traditional geometric parameter optimisation to include elements of the product specifications. Hence, the ultimate design goal will evolve accordingly and will seek to find the most appropriate combination of hydrographic and mechanical parameters such as to maximize the production of electricity over a given period of time in the year and within actual*

budget constraints. In other words, the proposed methodology will allow the consideration of a more abstract, higher level, market driven set of product requirements.

- ⇨ *The top 3 contributions for the year included the definition of a graduate student PDP adapted from the experiences drawn from large industrial projects at the Centre de technologies avancées BRP – Université de Sherbrooke. More specifically, 14 graduate students are currently working toward the development of models and design methodologies leading to product improvements or new products altogether. In this particular setting, the production of memoirs, thesis or scientific papers does not appear to be the best technology transfer vehicle between academia and industry. Hence, this effort to investigate the use of a product portfolio including prototypes, CAD models, computational results, custom design methodology along with a reduced set of the traditional academic production (papers and/or essay). So far, attempts to create a "design based" master degree track (as opposed to the traditional "research based" track), have found some resistance in the earlier step of the approval process. However, I have found that the design portfolio could be introduced much more easily as part of a statutes or rule, such as the one which permits the use of conference or journal papers in lieu of some memoir or thesis chapters. The design portfolio could therefore be an option within the traditional research based master degree. Nonetheless, work still need to be done before this can become reality.*
- ⇨ *Following the success of the collaborative project on the design of a cauldron for the Sherbrooke 2013 Canada Games, the opportunity to find a new similar project will be investigated with our partners from the department of Fine Arts at Bishop's University. Extending our collaboration for an additional year would help us to further validate our findings on culturally diverse team work. Eventually, collaborative work toward a common goal will be investigated from the perspective of each participant and a custom product development process will be inferred.*

- Development of innovative products and materials.
  - ⇨ *Over the next few years, the chair will keep working on the development of a new generation of submerged river turbine. Caroline Celette, the doctorate degree student recruited for this project is a highly motivated individual who currently puts great efforts in reviewing the literature on existing technologies.*

3. Chair resources
   - ⇨ *An intern was recruited for the summer 2013 semester. Its main task is to work on the preparation of academic material for an aluminum course. A new intern is likely to be hired to continue the development of this course over the fall 2013 semester.*
4. Other Chair matters & projects (developing a multiple track approach for supporting capstone projects)
   - ⇨ *Over the next few months, the Chair plans to adapt its strategy for the advertisement of the CQRDA financing (10 000$ per project) as well as other governmental grants that are available for supporting undergraduate capstone projects. A procedure will be developed and promoted through a formal classroom presentation at the time the projects are presented and selected by our students. The types of capstone projects our undergraduate students are working on and the corresponding potential financial support can be classified as follow:*
     - o Projects supported by industrial partners

       The projects that fall under this category are all eligible to receive financial support either from the CQRDA or other governmental agencies:

       A. Projects proposed by the chair at the undergraduate or graduate level

       Since its inception, the Chair has put great efforts and energy in contacting and

defining project directly with potential industrial partners. The companies were informed that financial support could be obtained from the CQRDA and their grant applications were even prepared by the Chair.

B. Projects proposed by the students with an already identified partner

The students are more likely to enroll in projects that they proposed themselves. Since some of those projects come with an industrial partner, the Chair has started to inform the students that it could support their industrial partner by preparing their CQRDA grant application, provided that the project makes use of aluminum toward the development of a product that is to go on the market.

- Projects with no industrial support (financed by donations and sponsors)

The projects that fall under this category are normally not eligible to receive financial support either from the CQRDA or other governmental agencies. The Chair will be devoted in helping the students organize themselves when they start raising funds:

C. Identify a potential industrial partner

As soon as a project is taking off with no official industrial partner, the chair and its professional will try to identify potential companies that could benefit from the results and be interested in establishing a partnership with the students.

D. Business creation by the students

Some of the creative ideas that are put forward by our students have great potential to lead to the creation of start-up companies. To that end, the Chair will connect students with the "Accélérateur de création d'entreprises technologiques" (ACET) whose purpose is obviously to accelerate the creation of technological enterprises and support their initial growth phase.

E. Crowdfunding

Looking for sponsors and donations is not an easy task. Moreover, our local companies are asked year after year to support capstone projects with donations. The chair will then promote crowdfunding opportunities and websites such as Kickstarter or Indiegogo. These websites help project promoters advertise their project around the world in order to get donations. The project backers do not get a stake in a company. They rather get publicity or small items in return for their donation such as t-shirts or coffee mugs.

e. Impact of Semi-Annual meetings

Please describe the influence last year's semi-annual meetings have had on your Design Chair. Note any impact or changes as a result of the meetings.

Last year I had a very enlightening discussion with fellow chairholder Michel Couturier who had evaluated my progress report. He was (rightly) critical on the relatively modest impact of my efforts and highlighted the fact that I should have exploited my privileged position as director of University Affairs at Centre de technologies avancées BRP (Bombardier Recreational Products) – Université de Sherbrooke (CTA) to develop the potential synergy with my Design Chair. This is something I was actually doing but was not putting forward in my progress report, as if both activities were merely separate research accounts. As a consequence, in the past year, I used the students at CTA as models for the development of an effective graduate student PDP suitable for the conduct of industrial graduate projects (third among the top three contributions for the year). I also used the CTA context and its hybrid roadster project as a benchmark for the application and validation of a Product Development Process (PDP), from prototype to product, developed by Cristian Iorga, one of my Ph.D. students (first among the top three contributions for the year). In short, that discussion with Michel was instrumental in shaping

my Chair program and activities in the past year.

2. Established Partnerships

Briefly describe the nature and extent of the involvement of the partners. Include details on how the results have been communicated to the partners (e.g. meetings, reports) and how the industrial partners have transferred knowledge and know-how to the university students, staff, and faculty.

The Design Chair is currently supported by three partners: REGAL, Alcoa and CQRDA. The following lines will explicit the extent of their involvement which is in line with their initial commitment. Alcoa's contribution is in kind, but it is central to the good operation of the Chair. Indeed, it includes the involvement, as industrial co-chair, of Russell Long, Chief Engineer, Ground transportation, at the Alcoa Technical Center (ATC) in Pittsburgh and also technical resources from Alcoa Innovation in Montreal. Mr Long has so far been very supportive, sharing knowledge and giving technical advices regarding the design of aluminum products and components supporting the hybrid roadster development project with Bombardier Recreational Products (BRP). The contribution of the Centre québécois de recherche et développement de l'aluminium CQRDA was through grants to Small to Medium size Enterprises (SME) for projects involving students from the Université de Sherbrooke. In 2012, two projects that qualified for these grants were launched with the following companies: Posi+ and MC2RI. The REGAL is a research centre on aluminum, supported by the Fonds de recherche du Québec Nature et technologies (FRQNT), the provincial equivalent of NSERC in Québec. REGAL was instrumental in the creation of the Design Chair as it was part of its strategic plan. REGAL is also the only partner whose contribution is in cash and not contingent upon the completion of specific projects or grant proposals. Being responsible of a research axis on aluminum product design and manufacturing within REGAL, the Chairholder pledged to disseminate to all member institutions, the course material and good practices that are to be generated through the Chair activities.

3. Sources of Financial Support

Please provide information about the cash and in-kind contributions received during the past year, noting the impact on the Chair activities as well as the estimated values for Chair leverage.

The Sherbrooke 2013 Canada Games committee has provided the chair with a 37 000$ cash contribution in the cauldron project. The Canadian Aluminum Association has also provided a cash contribution for an amount of 4500$ to shoulder the cost of laser cut aluminum parts. The contribution from Alcoa amounted to 30K$, in kind, for the last year. The majority of this contribution was made through meetings and direct interaction with Alcoa Innovation technical personnel. As indicated in the Chair proposal, the contribution of the CQRDA is in cash, for a total of 10K$ per project conducted in partnership with industry. In 2012, two projects were started with respectively Posi+, at the undergraduate level, and MC2RI at the graduate level.

4. Progress to Date

Please describe the progress to date made toward the following objectives.

a. Training

Please include all relevant information about courses developed or modified by the Chair focusing on design, the impact of these courses as well as any involvement in competitions etc. Please include the number of students impacted.

I. At the undergraduate level

As previously indicated, a new course entitled: " *Modern structural materials for the transportation industry*" is currently under development by a mechanical engineering intern. The course material produced will include course notes and accompanying slides. The course content is assembled using knowledge and references from the industrial co-chair, my colleagues from the REGAL research Centre and a graduate student team working on the design of the hybrid roadster aluminum frame at CTA. This task should be completed in the coming months. Another intern will be recruited for the fall semester to formalize specific PDP's in the "prototype to product" stream at the graduate level.
A series of webinar have also been organized with Russel Long from Alcoa on various topics related with *Design for aluminum*. The first one was held on March 19th 2013 and addressed design issues in the automotive industry. The webinar turned out to be a sheer success with 40 students attending the webinar in a class with a representative of Alcoa and an additional 40 persons attending remotely. Another webinar is already planned on assembly techniques applicable to aluminum.

II. At the graduate level

The Chair program includes graduate student training mainly through projects related to the Chair objectives. More specifically, these projects will connect to either one of two research streams: *advanced methodologies and design tools* or *the development of generic aluminum-related design technologies*. In the way of *advanced methodologies and design tools*, the Ph.D. work of Cristian Iorga on the integration of validation tools at the detailed design phase of the PDP is certainly a notable achievement toward that goal. Similarly, the *aluminum-related design technologies* stream is exemplified through the work of Ph.D. student Caroline Celette on the design of a river turbine.

Other strong initiatives toward the training of graduate students have been described in previous sections. More specifically, these include *the definition of a graduate student PDP adapted from the experiences drawn from large industrial projects* and *the development of a PDP from prototype to product* that would draw from the two Ph.D. works aforementioned.

b. Design and Development

Describe all relevant information about the design and development of innovative products, processes, systems and technologies.

Design and development of innovative products is central to the Chair on Design for Aluminum and the Université de Sherbrooke Mechanical Engineering program. On December 5th 2012, a total of 12 capstone projects from the department of mechanical engineering were presented to the public at the yearly Mecageniale Exhibition. Among all these capstone projects, five of them have been supplied with aluminum at the expense of the chair. Moreover, five projects out of 12 were done in collaboration with industrial partners that provided financial support in exchange of a prototype. The remaining projects came out from the student's own minds.

c. Collaboration

Describe any collaborations and interaction of the Chair with the department, faculty, university and outside colleagues during the past year in connection with the CDE action plan. Include collaborations with other CDEs, but do not include the Chairs regular workshop meetings.

The Sherbrooke 2013 Canada Games cauldron project described earlier is certainly one major experiment and achievement of the Chair in the past year. Indeed, in most, more traditional, so-called "multidisciplinary projects", students involved have typically similar background and vision such as those shared in mechanical and electrical engineering and even management and

marketing. In this perspective, setting up a project with students from different levels (secondary versus post-secondary), languages (French and English) and background (humanities, science and vocational training) was a true paradigm change. Adding to the challenge was the conduct of the project where each institution and program was pursuing specific learning objectives and achievements, each in a schedule of their own. Coordination, planning and communication then became paramount for the project to succeed and deliver the artwork in a global timeframe established by the client, the Canada Games.

d. Promotion

Describe any events and activities that were organized to raise the awareness and appreciation in the research and outside communities for all aspects of design engineering.

One major promotional activity organised by the Chair, was a breakfast at the Longueuil campus of the Université de Sherbrooke. The event was held on April 23rd with approximately 40 peoples attending the activity which featured speakers from CQRDA, Alcoa and the NSERC Chair offering the attendees, resources to support aluminum related industrial research. The choice of Longueuil for this event was not incidental, as Longueuil boasts the highest concentration of aluminum transformation businesses in the province of Quebec. Good contacts were made with industrials who invited the chair representatives to discuss project opportunities.
Presentations of the Chair in other aluminum related events were also performed in Montréal, Saguenay, Sept-Îles and Trois-Rivières.

5. Problems Encountered

Identify the main problems encountered during the past year, their impact and the steps taken to resolve each issue.

The major difficulty encountered by the chair arises from the fact that the undergraduate students often prefer to work on their own ideas which are not financed by any partners at all. Instead, they have to find different sponsors willing to support their projects. The selection process by which our students gather around an idea is also very democratic. The projects are publicly presented by the different promoters which include the undergraduate students themselves, some graduate students involved in technical groups, some professors who wish to push forward their research program and also some industrial partners. After the projects are explained publicly, a voting procedure takes place to narrow down the possibilities. It is quite common that 12 to 15 ideas of projects compete against each other to attract students when in fact there are enough students to form only five or six teams. Therefore, the chair may work very hard to attract and convince businesses that it is worth trying to submit a project more than once before it gets selected. These companies often work on a tight schedule and are eager to get the project completed. They may feel disappointed when their project is turned down by the students. In such a case, it may be hard to relight the flame and get the project presented four or even eight months later to a new group of students. As previously mentioned, the CQRDA provides 10k$ cash contributions to support capstone projects with industrial partners. Moreover, the financing of the chair is somehow tied to its ability to match an existing industrial partner with a group of students. Hence, it has been decided that the Chair would not only propose specific industrial projects tied to CQRDA financing, but that it would also propose the CQRDA financing to all eligible projects that are offered to our students. The Chair hopes that this change will pay off in the future; therefore generating more CQRDA supported projects.