# INSTRUCTIONS

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| --- |
| * Please make sure you are using the latest version of this form posted on  [**www.mitacs.ca/en/programs/accelerate/apply-now**](http://www.mitacs.ca/en/programs/accelerate/apply-now) * Please **do not modify, remove** text or instructions in each section/subsection **or reformat** this form in any way. A modified form will result in a delay in the internship evaluation process. * Detailed information onhow to write your proposal can be found in the [*Accelerate Guide: Writing your proposal document*](http://www.mitacs.ca/sites/default/files/uploads/page/writing_your_proposal_-_accelerate_2017.pdf). * Send your draft proposal to your [Mitacs Business Development Representative](http://www.mitacs.ca/en/contact-us/business-development) **prior** to obtaining all signatures and submitting. * The proposal should be written and submitted **at least eight (8) weeks prior to the planned start date of the internship.** * The start date of the internship has to be **after** research approval and the **receipt** of the partner funds at Mitacs. * Partner funds can be sent directly to Mitacs prior to approval to expedite the process. * If applicable, proposals with a not-for-profit partner must seek partner and project eligibility approval before proceeding. Please contact a [Mitacs Business Development Representative](http://www.mitacs.ca/en/contact-us/business-development) to discuss the eligibility of an NFP organization **BEFORE** submitting your application (see section 2.7). * If applicable, [conflict of interest declarations](https://www.mitacs.ca/sites/default/files/uploads/page/mitacs_conflict_of_interest_declaration_july2016.docx) must be received by Mitacs **before** submitting your application (see section 4.1/4.3). * If you cannot see the items listed in the drop downs, please refer to the Appendix B: Options and type the corresponding answer on the space provided. |

**Please note:**

If required, your **Mitacs Business Development Representative** can assist you with:

* Identifying your Office of Research Services (ORS) or equivalent representative.
* Assessing the eligibility and completeness of the proposed research.

# APPLICATION CHECKLIST

|  |
| --- |
| **A complete internship application package must include the following :**   * The proposal application **completed and signed** by all parties in Word form. *The Mitacs Accelerate Memorandum* (see Section 7) with signatures must be submitted as a scanned PDF file. * List of six external expert, arms-length reviewers and their contact information. * Intern(s) CV (a [CV template](https://www.mitacs.ca/sites/default/files/uploads/page/mitacs_accelerate_intern_cv_template_2017.doc) is available on the Mitacs website). * Lead Academic Supervisor's CV **only** for projects with **6 IUs and up** (CCV as per Tri-Council or other CV format). * Excel budget spreadsheet: *Accelerate Resource Plan and Invoicing*. * Any supplementary documents (as applicable). * Appendix A - Accelerate Intern Consent Form signed.   \* **An incomplete application or a modified form will result in a delay in the internship evaluation process.** |

For more information, contact a [**Mitacs Business Development representative**](http://www.mitacs.ca/en/contact-us/business-development)**.**

**Mitacs Accelerate Proposal Application**

### Research Proposal Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * 1. **Title of project:** | Optimizing modern day vinyl presses | | | |
| * 1. **Type of project:** Please indicate (x) | (\_) Standard | | | |
| (\_) Cluster (minimum of 6 internships and 3 interns) | | | |
| (X) Masters Fellowship (maximum 3 internships) | | | |
| (\_) PhD Fellowship (maximum 6 internships) | | | |
| * 1. **Number of Internship units:** | 3 | | | |
| * 1. **Keywords to identify reviewers:** (3-10 specific keywords; 50% technically related, 50% discipline-related) | vinyl records, audio, manufacturing, signal processing, physics, materials, engineering | | | |
| * 1. **Academic discipline:** | Physical Sciences | |  | |
| * 1. **Project priority sectors:** | Advanced Manufacturing | Entertainment & Media | | Technology |
| Please **rank up to three** top priority sector(s) of your project: | 1 | 2 | | 3 |

* 1. **List of participants:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Supervisor(s)** | | **Department** | | **Academic Institution** | |
| John Vanderkooy | | Physics and Astronomy | | University of Waterloo | |
|  | |  | |  | |
|  | |  | |  | |
| **Partner organization(s)** | **Contact name at partner organization** | | **Province of organization** | | **Partner Legal Status** |
| Viryl Technologies | James Hashmi | | Ontario | | For Profit Canadian Private Corporation |
|  |
|  |  | |  | | Select Legal Status |
|  |
|  |  | |  | | Select Legal Status |
|  |

* 1. **Proposed work plan for internship unit(s) (IU):**

Please summarize the work plan for the project by showing which intern will work when. This table provides a high level overview of the proposed research project and information about intern(s) to the reviewers. Please refer to the [**Accelerate Guide: Writing your proposal**](https://www.mitacs.ca/sites/default/files/uploads/page/accelerate_writing_your_proposal_19may2015.pdf)to assist you.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Years** | | | | **Year 1** | | | | | | **Year 2** | | | | | | | **Year 3** | | | | | |
| **Months** | | | | **1-4** | | **5-8** | | **9-12** | | **1-4** | | **5-8** | | | **9-12** | | **1-4** | | **5-8** | | **9-12** | |
| **Intern Name** | **Degree Program** | | **IU** |  | | | | | | | | | | | | | | | | | | | |
| Christopher Zaworski | Physics | | 3 | X | | X | | X | | X | | | X | |  | |  | |  | |  | | |
| **Total Internship Units** | | | **3** |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |
| **Total Project Funding** | | **$40 000** | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |
|  | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |

### Description of Proposed Research

* 1. **Project title:** Updating modern day vinyl presses
  2. **Research Abstract** (Approx. 200 words):

Please include: Research problem to be addressed and its significance, objectives, and proposed methodology. This section will be used to recruit reviewers; it differs from section 7.2. (Public Project Overview) and must clearly summarize the research proposed.

The Renaissance of vinyl records in the marketplace has been remarkable. Reasons for this re-emergence are not clear; there are psychoacoustic, psychological, artistic and human factors involved. In some quarters there is lingering doubt that a digital signal with discrete numbers cannot represent an analogue audio stream, although this has long been proven false [0]. Perhaps the attractive record jacket, the gleaming reflective disc, and the ritual of putting the record carefully into play are important aspects. Whatever the reason, old cutting lathes and aging record presses are back in vogue. This project seeks to study the optimization of mastering and pressing of records using new instruments and presses manufactured by Viryl Technologies.

The quality of a record pressing is determined by the characteristic of the vinyl used, its temperature, the force used to stamp the record, the final thickness of the pressing, the cycle time of the press, the efficacy of the flash cooling incorporated in the press, and possibly other factors. It is the aim of this research to study the effects of such parameters on the final quality of the pressed discs. This quality will be assessed by the surface noise, the frequency and severity of clicks and pops, the bandwidth and distortion of the recovered audio, and the morphology and warping of the final product. It is hoped that Viryl Technologies will be able to supply a series of music or test pressings that span the range of parameters required for a reasonable statistical analysis of the quality factors.

It is expected that the assessment of the record pressing can be accomplished by recording the audio output of test pressings on reference equipment. This recording will be digital and its quality must significantly exceed that of the record, so that the quality of the record pressing dominates.

This research project may lead to intellectual property that needs to be treated with respect. Viryl Technologies may wish to vet the publication of the thesis or interim reports. This must be balanced against the desire of the research personnel to publish the findings.

A major concern for the project is that a sufficient range of pressings with defined manufacturing parameters must be supplied to allow a meaningful statistical analysis of the influence of these parameters.

While this research is focused on the parameters used for the record presses themselves, it must be recognized that the mastering process is perhaps as important for the quality of the final product.

* 1. **Background** and review of relevant prior work (minimum 500 words):

Vinyl records are currently experiencing a sort of renaissance, Nielson Music has reported the 12th consecutive year of growth for vinyl record sales in 2017. Vinyl now holds a 14% share of physical album sales -- an all-time high for Nielsen.[1] This trend has not gone unnoticed by academia. Michael Palm of the University of North Carolina’s 2017 article, notes the backlog and bottlenecking that occurs in the vinyl supply chain.[2] A major cause for this backlog is the labour-intensive process of manufacturing records, as well as the unavailability and age of the equipment used in the manufacturing process.

It is not uncommon for modern record plants to employ presses dating back to the 1970s. This can cause unwanted and expensive delays, in one case a pressing plant had to spend $5000 to replace an obsolete screw on one such press.[3]

There is already research into improving the archaic process of manufacturing Vinyl records. Many of these attempts have been a radical shift in the way vinyl is manufactured, 3D printed records have long been a fascination however there are serious limitations in their audio reproduction that thwart the advent of 3D printed records.[4] Other attempts at reinventing vinyl manufacturing have received similar criticisms. There is much debate and skepticism that the new production methods will not be able to reproduce the quality of sound that the old presses did.[5]

Our research will fill a distinct lack of research into optimizing modern day record presses. Viryl Technology’s WarmTone press is one of the few new presses available on the market. Having access to the expertise and pressing capabilities at Viryl is a key component of this project.

The project will establish a method of assessing the quality of a vinyl record, explore the ability of a modern vinyl press to produce quality records, and probe into the pressing process of a vinyl record in order to see how modern analysis and materials may optimize the process. Whereas much of the current research involves completely reinventing the manufacturing process, this project will explore the techniques and processes currently employed in the marketplace today. By establishing a way to quantitatively assess vinyl record quality in the context of manufacturing, this project also has the opportunity to serve as the springboard for further innovation in the manufacturing of vinyl records.

* 1. **General objective** of the research project broken down into sub-objectives, activities, themes, or subprojects, as applicable:

The general objective of this research project will be to produce a Master’s thesis that is a sufficient analysis of press parameters, and gives Viryl Technologies the knowledge and analytical tools to determine if their customers are operating their presses to produce records of optimal quality.

**2.4.1: Produce a control group of test records with which to conduct measurement and develop analytical techniques**

A run of test records will be produced by Viryl under typical press conditions to serve as a baseline for analysis.

**2.4.2: Develop software tools for analyzing the digital recordings**

Now that there is a set of test records at the University, these can be used to develop the software and code that will be the basis of analysis once production of the test records begin in earnest.

**2.4.3: Decide upon manufacturing parameters to be tested and schedule press times for the records**

The next stage of the project will be to coordinate with Viryl engineers and press operators. A large number of records will need to be produced. This will most likely be done over a period of several months and so needs to be coordinated with Viryl’s pressing schedule to ensure a sufficient number of test records.

**2.4.4: Complete pressing and recording of the records**

Next, the pressing of the test records will begin. Their production will most likely be scattered and done in batches based around the pressing schedule at Viryl. As the pressing and recording of the test records is completed the intern will begin work on the final reports.

**2.4.5: Complete analysis and write the final reports**

The final stage of the project will be to produce the final Mitacs report, survey and the intern’s Master’s thesis.

* 1. **Details of internships or subprojects:**

**For each intern or subproject, provide the following mandatory information:**

* + 1. **Name of intern.**

Christopher Zaworski

* + 1. **Specific objectives of the internship or subproject**. Clearly state your [sub-] objectives so reviewers can assess if they are achievable.

Refer to section 2.4.

* + 1. **Methodologies**. Provide enough detail so reviewers can determine if the proposed methodology is appropriate and sufficient to achieve the [sub-] objectives.

The first stage of the project will consist of a small run of test records manufactured under typical conditions representative of current optimal press conditions, using recommendations from Viryl engineers.

Viryl will press a variety of records created explicitly for this study. The records contain quiet tracks, a series pure sine tones, and a log sweep up to 16 kHz. The official track listing is included with this proposal. The signals have been cut traditionally as a stereo signal, also in either the left or right channels, and vertically as a mono record would be. The records will contain this exact series of signals at both the beginning and end of the record, as well as on both sides of the record. That way the bottom and top pressings can be measured against one another, as well as signals pressed to the edge and centre of a vinyl record.

These records will be pressed by Viryl under varying conditions. Digital recordings of these vinyl records will be made at the University recording the audio output of high-quality reference equipment during playback. The quality of these digital recordings must significantly exceed the quality of the record such that it is the quality of the record pressing that dominates. Preliminary measurements of the equipment and vinyl records at the university show that achieving a digital recording that meets these requirements will be straightforward with modern day equipment.

The pure tones will be used to measure harmonic distortion at various frequencies while the tones cut into only the left and right channels will be used to determine the stereo/channel separation. Quiet grooves that contain no signal—such as the grooves that separate the tracks, will be used to take measurements of surface noise at various points in the record, and from them the important signal-to-noise ratio of the record can be determined. Additionally, the number and severity of pops and clicks on each record can be easily counted. These measurements will provide a quantitative measure of pressing quality.

The effect of parameter changes during the pressing process can be evaluated based on these measurements of quality.

In order to have significant results, a statistically large sample of records need to be made. A sample of approximately 10 records per parameter change will be taken in order to ensure any variation can be accurately distinguished.

While Viryl certainly has the capacity to produce these records, the most vital and time consuming part of the project will be the production of these test records under the various conditions needed for analysis. Viryl is currently in possession of two sets of stampers for these test records, which give them the capacity to press well over a thousand test records, with the ability to order more stampers should they need to.

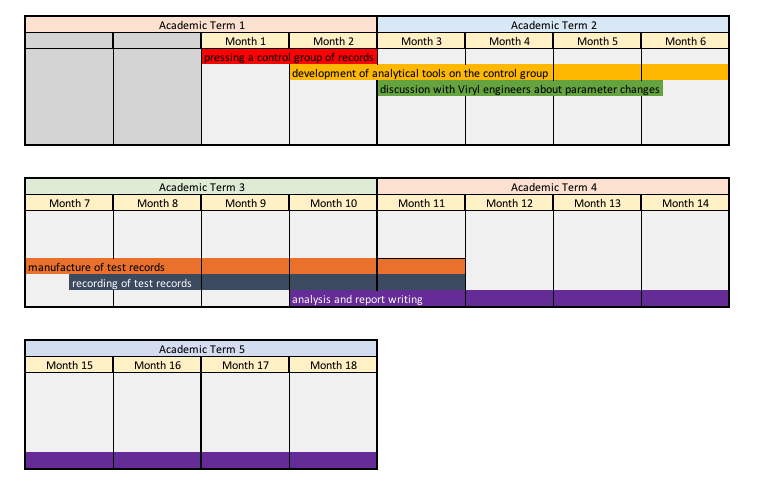
* + 1. **Timeline**. We suggest using a Gantt chart to provide a timeline showing which task will be done when to achieve each objective.

One of the first tasks to be completed is a pressing of test disks under the current recommended press settings according to the Viryl operators. These pressings will then be taken to the university and used as the basis for development of the software that will be used to analyze the digital recordings, and serve as a baseline dataset.

The next stage would be to determine what meaningful changes in the manufacturing process that Viryl engineers would like to explore, after which the manufacturing of these test records would begin. Their recording occur concurrently, as they will most likely be done in batches to accommodate when Viryl has some downtime on their presses.

A projected timeline is provided below. It is worth noting that many of these tasks can be completed concurrently. As outlined in Section 2.4 the key milestones of the project are:

* **2.4.1 Pressing of a control group of test records**
* **2.4.2 Development of software tools to analyze the digital recordings**
* **2.4.3 Decide upon what manufacturing parameters will be explored and schedule when the records will be pressed will those parameters alongside Viryl engineers**
* **2.4.4 Complete pressing and recording of the records**
* **2.4.5 Analyze the data and produce the final reports and masters thesis**

****

* + 1. **Expected deliverables.** Each project requires the submission of a completed Mitacs Final Report and Mitacs survey at the end of the project**.** Please describe the additional expected deliverables of the project i.e. expected outcomes, results, documents (intern’s thesis, peer-reviewed journal, conference presentation).

In addition to the Mitacs Final Report and Mitacs survey, this project will culminate in a Master’s thesis from the intern. Special care will need to be taken with the intellectual property in this project, Viryl may want to vet any publications. There are processes in place to handle intellectual property of graduate projects at the University of Waterloo.

* + 1. **Benefit to the intern.**

In addition to completing a masters project, the intern will gain valuable direct experience working with the equipment and techniques already being used by the record industry. The intern will directly see the industrial applications of his research and will be at the forefront of innovation in the manufacturing of vinyl records.

* + 1. **Interaction**. Indicate the percentage (%) of time during the project that the intern will spend on-site at the partner’s location and at the academic institution. Research should be carried out equally (50%) in the premises of the partner and the academic institution, if different, please include a **justification**. NOTE: Theminimum interaction at either site is 25% with a maximum of 75%.

% of partner interaction: \_\_50\_\_ % **+** % of academic interaction: \_\_50\_\_ % = 100%

* + 1. **Justification** for an interaction other than 50/50
    2. **Partner Interaction.** 
       1. Provide a detailed description of the activities that will be performed on-site at the partner organization and the expected interaction with and supervision by employees of the partner organization.

The partner organization will be responsible for the manufacturing of a series of vinyl records suitable for study, as well as providing expertise into the parameters of the press machines to be tested.

Viryl has several WarmTone presses in operation at their facility and will use these presses to manufacture the test records for study. Here the intern will meet with Viryl engineers and develop a plan for parameters that will be tested over the course of the project. The time spent at Viryl will be crucial for the research goals of this project, as having direct access to a record press and its designers and operators will allow the researchers to explore the pressing process.

The intern will oversee the production of the test records, gain immediate knowledge of the operation of a record press, and the parameters that control the final product.

* + - 1. Indicate the resources the partner organization will be providing to support the intern’s work at their premises. Include information about space, resources and expertise that will be provided by the organization to the intern.

The intern will be given a desk at Vinyl’s office and manufacturing facility in Toronto from which to work. A playback and recording setup very similar or identical to the one at the University of Waterloo will be set up in the office to allow the intern to take preliminary measurements of record pressings at Viryl. While at Viryl the intern will have direct access to the designers and operators of the vinyl presses at Viryl.

Viryl is one of the few manufacturers of new record presses. Their WarmTone press is at the cutting edge of innovation and is operating in record plants all around the world.

* 1. **Relevance to the partner organization and to Canada**:  
     Describe the partner’s proposed role in the project, how the partner will benefit from participating, and how the Canadian community will benefit from this research.

Viryl Technologies will benefit from the overall analysis of records pressed. They will hopefully learn the ideal operating conditions for the WarmTone press, as well as the effect that different manufacturing parameters have on record quality. This will allow Viryl to inform the owners/operators of WarmTone presses how to make a better quality record. The sort of analysis techniques required to be developed during this project will also serve as the backbone to any future attempts at improving the vinyl record medium as a whole.

Viryl Technologies’ Warmtone press has already made its impression worldwide, operating in record plants around the world. Canadian innovation will be at the forefront of the recent Vinyl renaissance.

* 1. **Project economic orientation (for submissions with a NFP organization ONLY):**Describe the economic or productivity orientation of the project. NOTE: if any partner listed in this proposal is a not-for profit (NFP) organization, please contact a [Mitacs Business Development representative](https://www.mitacs.ca/contact-us/business-development) to discuss its eligibility before proceeding with your proposal submission.

Not applicable.

* 1. **Relationship (if any) to past/other Mitacs Accelerate internships, Mitacs Elevate fellowships, or current applications in submission to any Mitacs program:**   
     Describe whether or not the current project is related AND provide specifics about the relationship (e.g. not related because it refers to a different research area OR if related: provide information about what has been achieved in past projects and how the current application complements other submissions)

Not applicable.

* 1. **References:\**

[0] refer to resolution below LSB

[1] Nielson. 2017 Year-End Music Report U.S. *Nielson*. Retrieved May 1st, 2018 from: <http://www.nielsen.com/us/en/insights/reports/2018/2017-music-us-year-end-report.html>

[2] Palm M, 2017. Analog backlog: Pressing records during the vinyl revival. *J. Pop. Music Stud*. 2017;29,e12247. <https://doi.org/10.1111/jpms.12247>

[3] Sisario B, 2015. Vinyl LP frenzy brings record-pressing machines back to live. *New York Times*. Retrieved May 1st, 2018 from: <https://www.nytimes.com/2015/09/15/business/media/a-vinyl-lp-frenzy-brings-record-pressing-machines-back-to-life.html>

[4] Ulanoff L, 2013. 3D record plays like the real thing. *Mashable*. Retrieved May 1st, 2018 from: <https://mashable.com/2013/03/12/3d-printed-record-plays/#axxZhoaDUgqg>

[5] Seppala, 2018. HD vinyl is a promise, not a product. *Engadget*. Retrieved May 1st, 2018 from: <https://www.engadget.com/2018/04/26/hd-vinyl-rebeat-innovations/?guccounter=1>

### Declarations

* 1. **Will the proposed research be taking place outside of the lab or normal business environment?**

\_\_\_No\_\_\_

**If yes*,*** please complete the following section to indicate what (if any) impact there may be on the environment.

1. Main characteristics of the location (i.e. physical description & coordinates).
2. Principal activity(ies): for each activity, list the environmental elements affected.
3. Are authorizations, permits, or licenses required to undertake any activity during the internship?

\_\_\_No\_\_\_

**If yes**, please list and include copies with your application.

* 1. **Does the proposed research involve living human subjects (including conducting interviews) or human remains, cadavers, tissues, biological fluids, embryos, or fetuses?**

\_\_\_No\_\_\_

**If yes,** the proposal must be approved by the participating academic institution’s Research Ethics Board\*, and a valid Ethics approval is required for the duration of the research project. Access to funding may be denied for projects that do not have ethical approval.

Please note: Mitacs may request a copy of the report to ensure compliance.

* 1. **Does the proposed research involve animal subjects?**

\_\_\_No\_\_\_

**If yes**, the proposal must be approved by the participating Institution’s Animal Care Committee\*, and a valid approval from the committee is required for the duration of the research project.

Please note: Mitacs may request a copy of the report to ensure compliance.

* 1. **Is a biohazards review required?**

\_\_\_No\_\_\_

**If yes**, the necessary review/report must be conducted in accordance with your academic institution’s policies\*, and a valid biohazards approval is required for the duration of the research project.

Please note: Mitacs may request a copy of the report to ensure compliance.

* 1. **Have any participants declared a Conflict of Interest (COI)\* as part of this application?**

\_\_\_No\_\_\_

**If yes,** please attach the signed conflict resolution letter.

*\* if you have any questions about the requirement for Research Ethics/Animal Care/Biohazards review or academic institution/Conflict of Interest Policies at your institution, please contact your corresponding institution's research office.*

### Participants Duplicate relevant section(s) as needed for multiple interns or supervisors.

**4.1. Academic supervisor:**

|  |  |
| --- | --- |
| Name: | John Vanderkooy |
| Academic Institution: | University of Waterloo |
| Department: | Physics and Astronomy |
| Address (at academic institution): | 200 University Ave W |
| City, Province, Postal Code: | Waterloo, ON, N2L 3G1 |
| Phone: | 519-888-4567 x 3222 |
| Permanent Email: | jv@uwaterloo.ca |
| Alternative E-mail: |  |

**4.1.1. Is the academic supervisor\*\*:**

1. An owner or a co-owner of the partner organization: \_\_\_No\_\_\_
2. A relative of an owner or co-owner of the partner organization: \_\_\_No\_\_\_
3. An employee of and/or a participant in the day-to-day management of the partner organization: \_\_\_No\_\_\_
4. A relative of the intern and/or partner supervisors of the proposed project: \_\_\_No\_\_\_

**If yes** to any of the above, please [click here](https://www.mitacs.ca/sites/default/files/uploads/page/mitacs_conflict_of_interest_declaration_july2016.docx) to complete the **Conflict of Interest Declaration** and send it to [accelerate@mitacs.ca](mailto:accelerate@mitacs.ca) **BEFORE** submitting your application.\*\*

**For any additional academic supervisors copy and paste Section 4.1. below:**

**4.2. Partner organization:**

|  |  |  |  |
| --- | --- | --- | --- |
| Legal name: | Viryl Technologies Corp. | | |
| Operating name (if different): |  | | |
| Contact name: | James Hashmi | | |
| Position: | CTO | | |
| Department: | Engineering | | |
| Address: | 16 Goodrich Rd, Unit D | | |
| City, Province, Postal code: | Toronto, Ontario, M8Z 4Z8 | | |
| Phone: | 1.844.468.4795 | | |
| Email: | [james@viryltech.com](mailto:james@viryltech.com) | | |
| Website: | [www.viryltech.com](http://www.viryltech.com) | | |
| Partner size (number of employees): | 1-49 |  | |
| Legal status: | For Profit Canadian Private Corporation |  | |
| If Not for profit Canadian Corporation | Select NFP Type |  | |
| **NAICS Code** (First three digits)\*: | 333 | | |
| \* [Click here for a list of North American Industry Classification System codes.](http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVDPage1&db=imdb&dis=2&adm=8&TVD=118464) | | | |
| Is this the **first time** the partner has collaborated with the academic institution? : | | Yes |  |

**For any additional partner organization copy and paste Section 4.2. below:**

* + 1. **Invoicing Partner Contact**

Partner contributions must be received by Mitacs BEFORE any funds are awarded to the academic institution. **Costs can only be incurred after research approval of the proposal** and the **receipt** of the partner funds at Mitacs**.**

Please describe any applicable **invoicing requirements** (vendor setup, PO, etc.):

|  |  |
| --- | --- |
| Invoicing contact name: | James Hashmi |
| Email: | james@viryltech.com |

**Invoicing Partner address**:

|  |  |
| --- | --- |
| X | Address same as filled in Section 4.2. |
|  | If invoicing address different than Section 4.2, please fill out the following: |

|  |  |
| --- | --- |
| Legal name: |  |
| Address: |  |
| City, Province, Postal code: |  |
| Name of contact: |  |
| Phone: |  |
| Email: |  |

Have these funds been leveraged against other federal or provincial programs? Yes\_\_\_ No\_\_\_

**If yes,** please provide details:

* + 1. **Partner Funds at academic institution. *IF APPLICABLE***

To be completed only if Partner funds were sent as an exception to the academic institution**. If no** please proceed to section 4.3.:

1. Is there a **research agreement** in place with the academic institution that governs the use of these partner funds?

\_\_No\_\_\_

**If yes** please speak with your BD representative, fill out the *addendum to research agreement document*, and submit that document with your completed application.

**If no** pleasecomplete the following:

1. ORS/UILO or equivalent agrees to send these funds to Mitacs: \_\_\_No\_\_\_

**If yes**, please provide:

|  |  |
| --- | --- |
| Academic institution account number: |  |

1. The partner agrees by signing this application that the funds can be forwarded: Yes\_\_\_ No\_\_\_

**If yes**, please provide:

|  |  |
| --- | --- |
| Name of the consenting partner representative |  |

1. **Invoicing academic institution contact** to receive Mitacs invoice:

|  |  |
| --- | --- |
| Name: |  |
| Department: |  |
| Email: |  |

1. Is the GST or HST, and QST (if applicable) to be included with invoice to academic institution? Yes\_\_\_ No\_\_\_

**If no**, tax(es) will be invoiced directly to the industry partner.

**4.3. Intern(s) identified:**

**4.3.1. Intern #1 information *\* MANDATORY \****

|  |  |  |  |
| --- | --- | --- | --- |
| Name: | Christopher Zaworski | | |
| Degree program during internship (college/masters/PhD/PDF): | masters | | |
| Expected year of graduation: | 04 | | 2020 |
| If PDF, indicate month/year PhD received: | -- | | -- |
| Academic institution: | University of Waterloo | | |
| Department: | Physics and Astronomy | | |
| Address at academic institution: | 200 University Ave W | | |
| City, Province, Postal code: | Waterloo, ON, N2L 3G1 | | |
| Phone: | 647-463-3342 | | |
| Permanent phone or Cell phone |  | | |
| Permanent email: | [cjzawors@uwaterloo.ca](mailto:cjzawors@uwaterloo.ca) | | |
| Alternative email: | christopherzaworski@gmail.com | | |
| Citizenship: | **Canadian** |  | |
| Gender: | **Male** |  | |

**4.3.2. Conflict of interest. Is the intern:**

1. An owner or a co-owner of the partner organization: \_\_\_No\_\_\_
2. A relative of an owner or co-owner of the partner organization \_\_\_No\_\_\_
3. An employee of and/or a participant in the day-to-day management of the partner organization:

\_\_\_No\_\_\_

1. A relative of the academic and/or partner supervisors of the proposed project: \_\_\_No\_\_\_

**If yes** to any of the above, please [click here](https://www.mitacs.ca/sites/default/files/uploads/page/mitacs_conflict_of_interest_declaration_july2016.docx) to complete the **Conflict of Interest Declaration** and send it to [accelerate@mitacs.ca](mailto:accelerate@mitacs.ca) **BEFORE** submitting your application.

**4.3.3. Demographic information. *\*OPTIONAL\****

**Please indicate (x) if you are:**

|  |  |  |  |
| --- | --- | --- | --- |
| Francophone: | (\_) | A person with a disability: | (\_) |
| Indigenous: | (\_) | First in your family to attend college or university: | (\_) |
| Member of a visible minority group - *includes persons who are non-Caucasian in race or  non-white in colour and who do not report being Indigenous* | | | (\_) |

**Social Media: Please provide usernames if you wish to connect with Mitacs by social media:**

|  |  |
| --- | --- |
| LinkedIn: | Christopher Zaworski |
| Twitter: | n/a |
| Facebook: | n/a |

**For any additional interns copy and paste Section 4.3. below:**

**4.4. Intern(s) to be determined (TBD):**

**4.4.1. TBD#1**

|  |  |
| --- | --- |
| Degree program during internship  (college/masters/PhD/PDF): | n/a |
| academic institution: | n/a |
| Department: | n/a |

**For any additional TBD interns, copy and paste Section 4.4. below:**

### Resource Plan and Invoicing

All Accelerate projects are required to complete the Accelerate Resource Plan and confirm the Invoicing schedule on the Excel Budget spreadsheet template. Please refer to the [**Accelerate Guide: Writing your proposal**](http://www.mitacs.ca/sites/default/files/uploads/page/writing_your_proposal_-_accelerate_2017.pdf) to assist you

### Suggested Reviewers

* 1. **Reviewer’s comments.** Please select ONE of the following:

\_\_\_ We consent to receive reviewer’s comments in either official language (French or English).

\_X\_ We request to only receive reviewer’s comments in the language of which this proposal is submitted.

* 1. Please provide the names and contact information of at least **SIX (6)** **arms-length** reviewers.

An arms-length reviewer must:

* Be a recognized expert in the research topics and technical aspects covered by the proposal;
* NOT be from the same academic institution as the intern(s) or the academic supervisor(s); and
* NOT have had any collaboration with the intern(s) or the academic supervisor(s) or the partner(s) during the past five (5) years or planned for the near future.

Please note that neglecting to suggest reviewers who qualify as arms-length will delay the review of your application.

**Reviewer 1:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Reviewer 2:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Reviewer 3:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Reviewer 4:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Reviewer 5:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Reviewer 6:**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Email: |  |

**Potential conflict of interest. *\*OPTIONAL\****

Please list reviewers you would prefer Mitacs not to contact.

|  |  |
| --- | --- |
| Name: |  |
| Academic institution / Research Group: |  |

|  |  |
| --- | --- |
| Name: |  |
| Academic institution / Research Group: |  |

### Mitacs Accelerate Memorandum

The participants listed below confirm that the information presented accurately reflects their intention to apply to the Mitacs Accelerate program. The participants have also agreed to set in place an internship based upon the attached proposal. The participants acknowledge that they have read, understood and agreed to abide by and uphold the Project Responsibilities applicable to each of them, available for reference at: <http://www.mitacs.ca/en/programs/accelerate/project-responsibilities> which include and are not limited to the following: It is understood that the partner organization contribution shall be provided to Mitacs Inc. prior to commencement of the internship; in the event that the sponsor organization funds are at the academic institution, the academic institution shall forward these funds to Mitacs. Upon research approval and the reception of the partner funds at Mitacs, Mitacs shall forward the funds to the academic institution as a research grant to the supervising professor, and the internship stipend/salary will be paid to the student by the academic institution from the grant. Costs associated with this proposal as outlined in the budget can only be incurred after research approval of the proposal and the receipt of the partner funds at Mitacs.

Mitacs is unable to assume liability for any losses including—but not limited to—accidents, illness, travel, or other losses that may occur during the internship period. All undersigned parties agree that they are responsible for ensuring that they have appropriate insurance and meet any institutional policies regarding health, safety, and travel preparation requirements. All parties also agree that the intern will provide Mitacs with a final report and that all participants will complete an exit survey within one month of project completion.

All parties involved with Mitacs Accelerate are bound by the standard intellectual property (IP) terms of the academic institution where the intern is enrolled; except where intellectual property is covered by separate agreements to which the academic institution and the sponsor organization are parties and that are active during the dates of the internship. By signing this memorandum, you are acknowledging that you agree to the terms of the academic institution where the intern is enrolled. institution-specific IP policies regarding Accelerate internships can be found at [Frequently Asked Questions (FAQ)](https://www.mitacs.ca/en/programs/accelerate/faq).

The participants listed below agree that Mitacs can disclose the provided personal information included in this proposal (e-mail, LinkedIn, Twitter, Facebook, etc.) to the program’s funding partners. Mitacs can use this information for the purpose of communication and to evaluate the program and its outcomes during and after participants’ program tenure. The participants also agree that Mitacs will post the title of the project, the public project overview, the name of the partner(s) organization(s), the name of the intern(s), the name of supervisor(s) and the involved academic institution on [www.mitacs.ca/en/projects](http://www.mitacs.ca/en/projects) and may be used by Mitacs to publicize Mitacs Accelerate. Mitacs Privacy Policy can be found at [www.mitacs.ca/en/privacy-policy.](https://www.mitacs.ca/node/20705)

Internship participants (intern, supervising professor, and partner) further agree to the following addendum(s):

Mitacs does not require, inspect, or enforce any additional terms as outlined by participants in the above addendum.

**7.1. Title of the Project:**

Updating modern day vinyl presses

**7.2. Public Project Overview:**

Using simplified language understandable to a layperson; provide a general, one-paragraph description of the proposed research project to be undertaken by the intern(s) as well as the expected benefit to the partner organization. **(100 - 150 words)**

Viryl technologies currently manufactures one of the worlds only modern day vinyl record presses. The recent vinyl renaissance has taken the marketplace by storm. The quality of a record pressing is determined by the characteristic of the vinyl used, its temperature, the force used to stamp the record, the final thickness of the pressing, the cycle time of the press, the efficacy of the flash cooling incorporated in the press, and possibly other factors. It is the aim of this research to study the effects of such parameters on the final quality of the pressed discs. Using modern day digital signal processing analysis on the age-old analog medium in order to bring the manufacturing of vinyl records into the modern age!

### 7.3. Participant Signatures:

### Please sign, scan and save in PDF format

**7.3.1. Intern:**

|  |  |  |
| --- | --- | --- |
| Name: | Christopher Zaworski | |
| Department: | Physics and Astronomy | |
| Academic institution: | University of Waterloo | |
| Signature: |  | Date: |

7**.3.2. Academic Supervisor:**

|  |  |  |
| --- | --- | --- |
| Name: | John Vanderkooy | |
| Department: | Physics and Astronomy | |
| Academic institution: | University of Waterloo | |
| Signature: |  | Date: |

**7.3.3. Partner Organization:**

|  |  |  |
| --- | --- | --- |
| Name: | James Hashmi | |
| Department: | Engineering | |
| Title/Position: | CTO | |
| Organization: | Viryl Technologies Corp | |
| Financial Commitment: | $18 000 | |
|  | The partner organization commits to the funding contribution specified directly above and the payment schedules outlined in the attached *Accelerate Resource Plan and Invoicing* schedule. These are key conditions of the application and by signing below this proposal, the partner organization agrees to these conditions. | |
| Signature: |  | Date: |

**7.3.4. Office of Research Services Representative or equivalent:**

|  |  |  |
| --- | --- | --- |
| Name: |  | |
| Title/Position: |  | |
| Academic institution: |  | |
| Signature: |  | Date: |

**For any additional participants include corresponding details and signature line below:**

### Appendix A – Accelerate Intern Consent Form

**USE AND DISCLOSURE OF PERSONAL INFORMATION PROVIDED TO MITACS**

1. All personal information collected is subject to privacy legislation and Mitacs Privacy Policy for Program Participants. For a description of Mitacs’ commitment to protect the personal information provided by program applicants, please see <http://www.mitacs.ca/en/privacy-policy>.
2. All the information supplied in this application will be made available to Mitacs staff responsible for managing the application, for activities including identifying appropriate peer reviewers, administering and monitoring awards, compiling statistics, and evaluating the program.
3. Information supplied in this application will be made available to internal and/or external reviewers, being composed of experts recruited from the academic, public and private sectors. All reviewers are required to commit to keep the application information confidential.
4. Contact information in this application may be used by Mitacs staff to contact you in future for:
   1. Invitations to be profiled in stories or news items, to speak at or attend events, to provide a spotlight story and/or blog post;
   2. Communications about opportunities for Mitacs alumni; and
   3. Research surveys for Mitacs alumni.

You will have the opportunity to unsubscribe from emails sent to you, once all commitments regarding the internship that is the subject of this application are complete.

1. Your name, academic institution and department, and the title of your project may be provided to the federal, provincial and academic institution funders of the Accelerate program, to:
   1. Enable Mitacs to report on funding contract commitments; and
   2. Allow the funders to evaluate the program.

Note that all Canadian provincial and federal governments, and academic institutions, are bound by privacy legislation and are therefore bound to keep your personal information confidential.

1. Your name and contact information may be provided to the academic institution at which this internship takes place to enable the academic institution to manage the award and for reporting purposes.

I, the undersigned, do hereby give CONSENT to the use and disclosure of the information contained in my application for the purposes as described above.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Intern Name Signature Date

**Appendix B** **- Drop Down - Options**

### Please delete if not applicable

Please refer to the drop down of the section, and type the corresponding answer on the space provided.

**1.5. Academic discipline:**

* Business
* Computer Science
* Earth Sciences
* Engineering
* Life Sciences
* Mathematical
* Sciences Social Sciences, Arts & Humanities
* Physical Sciences

**1.6. Project priority sectors:**

|  |  |  |
| --- | --- | --- |
| * Indigenous Affairs | * Entertainment & Media | * Natural Resources |
| * Advanced Manufacturing | * Environmental Science & Technology | * New & Digital Media |
| * Aerospace | * Finance & Insurance | * Ocean Tech |
| * Agriculture & Food | * Forestry | * Oil & Gas |
| * Aquaculture & Fishing | * Green/Alternative Energy | * Pharmaceuticals |
| * Automotive | * Health and Related Sciences & Technology | * Public Service, Policy, & Governance |
| * Biotechnology | * Information & Communications Technology | * Sustainability & the Environment |
| * Clean Technology | * Life Sciences (not health) | * Technology |
| * Commercial Services | * Manufacturing & Construction | * Tourism |
| * Construction | * Mining | * Transportation |
| * Education | * Nanotechnology | * Water |
| * Energy & Utilities | * Natural Gas | * Other (please describe) |

**1.8. List of Participants:**

**Partner Legal Status:**

* For Profit Canadian Private Corporation
* Crown Corporation
* Not for Profit Canadian Corporation

**4.2. Partner organization:**

**Partner size (No. employees):**

* 1 to 49
* 50 to 99
* 100 to 499
* 500 and higher

|  |  |
| --- | --- |
| **Legal status:** | **If NFP:** |
| * For Profit Canadian Private Corporation | * Charitable Organizations |
| * Crown Corporation | * Economic Development Organizations |
| * Not for Profit Canadian Corporation | * Health Organizations |
|  | * Industry Associations |
|  | * Social Welfare Organizations * Other |

**4.3.** **Intern(s) identified:**

**4.3.1. Citizenship**:

* Canadian:
* Permanent Resident:
* Foreign:

**Gender**

* Female
* Male
* Other gender identity