



FRAUNHOFER PROJECT CENTRE for BIOMEDICAL ENGINEERING & ADVANCED MANUFACTURING (BEAM)

February 2014



McMaster University and Fraunhofer-IZI Collaboration

- The Fraunhofer-IZI Institute for Cell Therapy and Immunology (Leipzig-Germany) has expressed significant interest in working with McMaster University and the City of Hamilton
- Fraunhofer-IZI has a keen interest in a number of research areas in which McMaster University is recognized as a global leader
- Fraunhofer-IZI has expressed a strong interest in locating a project centre at the McMaster Innovation Park (MIP) that will focus on Cell Therapies and Biomedical Engineering
- The Fraunhofer Project Centre@Western, London, Ontario provides a model for successful community economic development:
 - To date, creation of 20 highly skilled research positions
 - Resource centre for regional SMEs developing their R&D – accessing space, services and research expertise
 - Increased awareness of Ontario research talent on an international scale
 - Internships for students to work abroad, learn from leaders in their field and bring their knowledge back to Ontario



The Project Centre

- Research Foci: Automated microprocess development and instrumentation for the production of individual Human Cells for Therapeutic Applications

Point-of-care Diagnostics and Biointerfaces
(i.e., handheld infectious disease management system)

- The project centre is expected to directly create 70 - 100 jobs. Many of these positions will be filled by highly qualified individuals who will be relocating to Hamilton with their families from across Canada and from overseas



The Project Centre cont'd

- The new facility will attract visiting scientists and industry researchers from around the world as they collaborate on research projects unique to the Hamilton facility
- The spin-off opportunities will create significant economic development opportunities in Hamilton and the surrounding region including indirect job opportunities
- This collaboration between McMaster and Fraunhofer-IZI has attracted the attention of many companies, some of which are clients of Fraunhofer in Europe. These companies are interested in establishing themselves in the vicinity of the project centre



McMaster
University



The Need

- Personalized medicines derived from the patient's own cells for the treatment of cancer, infectious diseases, multiple chronic diseases and the regeneration of damaged tissues are a rapidly growing reality
- There is an unmet need to provide the growth capacity in personalized cell manufacturing for, ultimately, hundreds of thousands of individual patients



The Opportunity

- This gap represents an opportunity for McMaster, Fraunhofer, Hamilton and the Province to capitalize on our expertise in medicine and engineering to develop a new industry around manufacturing - the instruments, systems management tools and sterile environmental enclosures - that will be required by companies around the world to take on the challenge of personalized cell therapies at the most advanced stages



The Opportunity cont'd

- The business opportunity lies in the development of novel cell manufacturing systems, using a variety of engineering specialties to provide instrumentation that will allow multiple and parallel manufacturing of cell therapies under strict and robust sterile conditions [clinical grade, good manufacturing practice (GMP) requirements]. These engineering specialties include:
 - Nanotechnology
 - Materials science
 - Microfluidics
 - Software engineering
 - Biosensors
 - Cell biology
 - Stem cell biology
 - Immunology



The Opportunity cont'd

- The Fraunhofer-IZI Project Centre is perfectly aligned with the recommendations of the Life Sciences Strategy recently developed by the Hamilton Chamber of Commerce:

"Champions must emerge. Key industry shareholders in both the private and public sector must create a unified vision, convene to identify specific goals and act as a champion group that leads the development of a local cluster mentality."

- Hamilton has a strong history of manufacturing excellence and a well-trained workforce – key requirements to create a number of new companies involved in the manufacturing of novel instrumentation
- The opportunity to establish a new industry in Hamilton which will comprise multiple aspects of the cell therapy value chain including:
 - 1) production of personalized cell therapies
 - 2) development of improved processes for cell production
 - 3) creation and manufacture of instrumentation for automated production of cell therapies
 - 4) tools for administering the cell therapies



The Opportunity cont'd

- This is a unique and ideal opportunity for Hamilton and Ontario to capture the true economic value of the research that is conducted in McMaster's facilities
- The University, working in partnership with the City of Hamilton, the Ontario Government and the Federal Government, can secure this opportunity which is guaranteed to attract investment and create valuable jobs
- Other benefits include: developing a new biomedical industry focused on cell therapies and attracting highly qualified scientists to Hamilton and expanding the Province's global reputation



The Opportunity cont'd

- Establishing our capacity for the provision of cell growth of all types will benefit the life sciences sector supply chain:
 - Automation, instrumentation and sensor companies will benefit from increased activity, processing and production requirements
 - Manufacturing spin-out, i.e., plastics, specialized materials
 - Cutting-edge new developments will require specialized trainees, all of whom exist or will be trained in Hamilton
 - Make use of existing manufacturing at McMaster/Hamilton



Industrial Partnerships

- Companies located in Germany willing to consider a subsidiary in Hamilton
 - Miltenyi Biotec, Bergisch Gladbach
 - SoNovum AG, Leipzig
 - TissUse GmbH, Berlin
- Others interested in GMP automation projects at BEAM
 - Prima BioMed, Australia
 - Northwest Biotherapeutics, United States
 - Biospherix Ltd., United States
 - Corning, United States
 - Qiagen, Germany
- Confirmed commitment from CISCO Canada: \$250,000 cash



Industrial Partnerships cont'd

- Exploring partnerships with numerous North American companies including:
 - Janssen, Toronto, ON
 - Microbix Biosystems, Mississauga, ON
 - Eli Lilly Canada, Toronto, ON
 - Spectral Diagnostics, Toronto, ON
 - Baxter Canada, Mississauga, ON
 - Genzyme Canada, Mississauga, ON
 - Qiagen, Toronto, ON
 - DNA Genotek, Kanata, ON
 - Celgene, Mississauga, ON
 - Amgen Canada, Streetsville, ON
 - Anogen/Yes Biotech, Mississauga, ON
 - Invitrogen, Burlington, ON
 - Hoffman La Roche, Laval, Quebec
 - Sernova, London, ON
 - NeoStem, New York, NY
 - Safeguard Biosystems, Toronto, ON



Industrial Partnerships cont'd

- StemCell Technologies, Vancouver, BC
- Dimatix, Santa Clara, CA
- Scienion, Monmouth Junction, NJ
- Bruker, Milton, ON
- GE Healthcare, Mississauga, ON
- Pro-Lab, Richmond Hill, ON
- Neo Ventures, London, ON
- IBM, Markham, ON
- DNA Genotek, Kanata, ON
- PerkinElmer, Woodbridge, ON
- Axela Biosensors, Toronto, ON
- Endetec, Kingston, ON
- Guage Scientific, Redwood City, CA
- EcoLab, Mississauga, ON
- GSK, Mississauga, ON



Proposed Funding: Operating Costs

- Fraunhofer-IZI has committed \$10M towards the Project Centre operating cost (representing 50% of the total estimated operating cost over 5 years)
- McMaster contribution to the operating cost (50%) will be covered by new grants and research contracts



Proposed Funding: Renovations and Fit-Out Costs

- We anticipate that the new facility, initially, will occupy 40,000 - 50,000 square feet at MIP. We plan to renovate space in the current “warehouse” – the same facility that is the home of the McMaster Automotive Resource Centre (MARC) – for an estimated cost of \$20M
- We are seeking financial support from:
 - Province of Ontario
 - Federal Economic Development Agency for Southern Ontario (FedDev)
 - City of Hamilton



Proposed Funding: Renovations and Fit-Out Costs cont'd

- Proposed sources of funding breakdown:
 1. McMaster University: Access to 40,000 – 50,000 sq. ft. at the MIP warehouse (@ \$100/sq ft): \$4M
 2. Province of Ontario: \$4M
 3. Federal Economic Development Agency for Southern Ontario (FedDev): \$8M
 4. City of Hamilton: \$4M

TOTAL - \$20M