**The Foreign Research Participant Program at the Department of Agriculture and Agri-Food of Canada (AAFC) /**

***Le Programme de recherche pour les participants étrangers au ministère de l’Agriculture et de l’Agroalimentaire du Canada (AAC)***

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| **Notes for applicants to the foreign research participant program:** | **Remarques à l’intention des candidats au programme de recherche pour les participants étrangers :** |
| * Who can apply? International science talent including students (especially graduate students-Ph.D./Master’s), scientists and research professionals (including post-doctoral fellows) from foreign countries who have or will have scholarships to cover their accommodation and living expenses while in Canada. The scholarship usually comes from a funding agency in the applicant’s country of origin or from an international organization. There is no scholarship program at AAFC. * The international science talent are welcome to participate in AAFC’s research activities, as “foreign research participants” (FRPs). The research opportunity will take place at an AAFC research facility or a partner lab in Canada. AAFC provides research guidance, scientific training, research space and materials. Tuition fees for FRPs are not applicable/needed at AAFC. The research subjects should be of mutual interest, priority and benefit to research teams in Canada and to the FRP’s home country and/or sponsoring organization and should relate to the agriculture and agri-food sector. * If necessary to get the scholarship, an applicant or potential FRP can contact the AAFC scientist of interest (potential supervisor) to discuss the research opportunity and obtain supportive documents such as a Letter of Acceptance Intent. Applicants should provide recommendation letters to AAFC scientists from their home/sponsor organizations and must demonstrate they meet the academic and language merit criteria to be retained for further consideration. English or French language capacity is essential to conduct research at AAFC. * All legal requirements and regulations are followed in accordance with AAFC rules and Canadian laws. Namely, signing of AAFC’s Research Participant Agreement by the selected research participant, the participant’s home organization (as the sponsor) and the host AAFC research centre is mandatory after the applicant successfully obtains a scholarship and before coming to Canada. The Agreement states the rights and responsibilities of the respective signatories and covers the duration and description of the research project, intellectual property rights and insurance requirements related to health and civil liability. * During stay at AAFC, each research participant remains an employee or student affiliated with one’s home organization in the country of origin. The research participation does not create an employer-employee relationship between AAFC and the research participant. * AAFC with research centres across Canada is well established to conduct world class science and innovation. For detailed information on AAFC Science and Innovation, please visit the AAFC online at: <http://www.agr.gc.ca/eng/science-and-innovation/> | * Qui peut poser sa candidature? Les talents internationaux en sciences, y compris les étudiants (particulièrement les étudiants de maîtrise et de doctorat), les scientifiques et les chercheurs professionnels (y compris les titulaires d’une bourse de recherches postdoctorales) originaires d’un pays étranger qui ont ou auront des bourses couvrant leurs frais d’hébergement et de subsistance. Habituellement, un organisme de financement du pays d’origine du candidat ou un organisme international offre la bourse. Il n'existe aucun programme de bourse de recherche à AAC. * Les talents internationaux en recherche sont invités à participer aux activités d'AAC à titre de participants étrangers à la recherche (PER). Les travaux se feront dans une installation de recherche d’AAC ou dans le laboratoire d'un partenaire au Canada. AAC assure l’encadrement, la formation scientifique, l’espace de travail et le matériel de recherche. Le programme de PER de AAC ne requiert pas de frais de scolarité. Les sujets de recherche doivent être prioritaires, bénéfiques et d’intérêt commun pour les équipes de recherche du Canada et le pays du participant étranger ou l’organisme qui le parraine et doivent porter l’agriculture et l’agroalimentaire. * Pour les besoins d’obtenir une bourse, les candidats et les PER potentiels peuvent communiquer avec le scientifique d’AAC (superviseur potentiel) dont le domaine de recherche les intéresse pour discuter de l’opportunité de recherche et obtenir des documents de soutien, tel qu’une lettre indiquant l’intention du scientifique d’accepter leur candidature. Pour que leur candidature soit prise en considération, les candidats doivent fournir aux scientifiques d’AAC des lettres de recommandation de leur organisme d’attache ou qui les parraine et faire la preuve qu’ils satisfont aux critères de mérite relatifs aux études et aux connaissances linguistiques. La capacité de travailler en français ou en anglais est essentielle pour faire de la recherche à AAC. * Tous les règlements et obligations juridiques sont suivis conformément aux règles d’AAC et aux lois du Canada : une entente de participation à la recherche d’AAC doit être signée par le candidat sélectionné, son organisme d’attache (à titre de parrain) et le centre de recherche d’AAC qui l’accueille une fois la bourse obtenue et avant la venue au Canada. L’entente énonce les droits et les responsabilités respectives des signataires, décrit le projet de recherche, en indique la durée et précise les droits de propriété intellectuelle ainsi que les exigences en matière d’assurance santé et responsabilité civile. * Pendant son séjour à AAC, chacun des participants demeure l’étudiant ou l’employé de l'organisme d’attache de son pays d'origine. La participation à la recherche ne crée pas de relation d’employeur à employé entre AAC et lui. * Avec ses centres de recherche du Canada, AAC est bien placé pour entreprendre et poursuivre des travaux scientifiques et d'innovation de calibre mondial. Pour en savoir plus sur la science et l’innovation à AAC, veuillez consulter le site Web d'AAC à : <http://www.agr.gc.ca/fra/science-et-innovation/>. |
| **For general inquiries about the Foreign Research Participant Program (FRPP) at AAFC, contact**:  Shan He  International Engagement Division,  Science and Technology Branch,  Agriculture and Agri-Food Canada (AAFC)  1341 chemin Baseline Road, T5-5-128  Ottawa, Ontario, Canada K1A 0C5  E-mail: shan.he@agr.gc.ca  Telephone: 613-773-1834  Facsimile: 613-773-1833 | **Renseignements généraux sur le Programme de recherche pour les participants étrangers (PRPE) à AAC** :  Shan He  Division de l’engagement international  Direction générale des sciences et de la technologie  Agriculture et Agroalimentaire Canada  1341 chemin Baseline Road, T5-5-128  Ottawa, Ontario, Canada K1A 0C5  Courriel : shan.he@agr.gc.ca  Téléphone : 613-773-1834  Télécopieur : 613-773-1833 |

**The List of proposals for Foreign Research Participants at AAFC / Liste des propositions d’AAC pour les participants étrangers à la recherche (2016.01)**

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| Notes: Enclosed below are research proposals (in English) which are approved projects submitted by AAFC scientists currently seeking international science talent to participate in AAFC research starting in the 2016-17 fiscal year. For more information on expertise and profiles of these AAFC scientists and others of interest, please visit the “Scientific Staff and Expertise” at AAFC online, <http://www.agr.gc.ca/eng/science-and-innovation/>. The description is available in both English and French languages. | Remarque : Vous trouverez ci-dessous propositions de recherche (en anglais) lesquelles sont des projets approuvés présentés par les scientifiques d’AAC qui sont actuellement à la recherche de talents internationaux en sciences afin de participer aux travaux de recherche d'AAC à compter de l'exercice 2016-2017. Pour connaître le profil et le domaine d’expertise de ces scientifiques d'AAC et d'ailleurs, visitez la page « Personnel et expertise scientifique » à <http://www.agr.gc.ca/fra/science-et-innovation/> . L’information est accessible en français et en anglais. |

**The List of proposals for Foreign Research Participants at AAFC (2016.01)**

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| **Proposal ID** (2016, Host City\_AAFC scientist name) | **Proposal Title** | **Duration** (months) |
| [Fredericton\_Li, Xiu-Qing](#Fredericton_Li_Xiuqing) | Improving potato using genomic approaches | 12-24 |
| [Guelph\_Gong, Joshua](#Guelph_Gong_Joshua) | Control *Salmonella* infection in the gut | 24 |
| [Guelph\_Lepp, Dion](#Guelph_Lepp_Dion) | Assessment of *Clostridium perfringens* pili in vaccine development for controlling necrotic enteritis in chickens | 12-24 |
| [Guelph\_Zhou, Ting](#Guelph_Zhou_Ting) | Mitigation of Fusarium Mycotoxins by biodetoxification | 12-24 |
| [Harrow\_Yang, Jingyi](#Harrow_Yang_Jingyi) | Using crop soil models to simulate soil C N and water cycle in plant, soil, water and atmosphere systems at field and regional scales | 24 |
| [Kentville\_Fan, Lihua](#Kentville_Fan_Lihua) | Investigation of heat-resistant bacteria and/or fungi to ensure food safety and quality | 12-24 |
| [Kentville\_Song, Jun](#Kentville_Song_Jun) | Quantitative proteomics and metabolomics approaches to study insect resistance of tree fruit rootstocks | 12-24 |
| [Lacombe\_Juarez, Manuel](#Lacombe_Juarez_Manuel) | Development of decision making tools for sustainable beef production in Canada | 4-12 |
| [Lethbridge\_Hao, Xiying(1)](#Lethbridge_Hao_Xiying_1) | Rangeland soil health under cow-calf beef production | 18-24 |
| [Lethbridge\_Hao, Xiying(2)](#Lethbridge_Hao_Xiying_2) | Novel livestock manure and compost for soil health | 24 |
| [Lethbridge\_Yang, WenZhu](#Lethbridge_Yang_WenZhu) | Use of exogenous enzymes to improve nutritive value of crop residues by ruminants | 24 |
| [London\_Tian, Lining](#London_Tian_Lining) | Develop disease resistant crops using genome editing approach | 24 |
| [London\_Yuan, Ze-Chun](#London_Yuan_ZeChun) | Exploit plant growth promoting bacteria to improve crop production, disease management and agricultural sustainability | 12-48 |
| [Ottawa\_Fernandez-Triana, José](#Ottawa_FernandezTriana_Jose) | Systematics of braconid wasps (Hymenoptera) in China and Canada | 3-12 |
| [Sherbrooke\_Ibeagha-Awemu, Eveline(1)](#Sherbrooke_IbeaghaAwemu_Eveline_1) | Understanding the genetic bases of lactation persistency | 24 |
| [Sherbrooke\_Ibeagha-Awemu, Eveline(2)](#Sherbrooke_IbeaghaAwemu_Eveline_2) | Regulatory roles of non-coding RNA in the pathogenesis of bovine paratuberculosis | 24 |
| [Swift Current\_Iwaasa, Alan](#SwiftCurrent_Iwaasa_Alan) | Grazing Systems and Forages Effects on Environmental Grassland Ecosystems | 24 |
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| [Proposal ID/No de la proposition](#A_ID): | | Fredericton\_Li, Xiu-Qing | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Improving potato using genomic approaches** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  Tentative date : 2016-07-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-12-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( X )   Visiting scientist / *Chercheur invité* ( X ). Note : The proposed project needs a PhD student and a visiting scientist. | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 12 to 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 2 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Fredericton, New Brunswick | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Xiu-Qing Li**  Field of expertise / *Domaine d’expertise* : Molecular genetics; genomics; potato somatic breeding | | | | E-mail/*Courriel* :  Xiu-Qing.Li@Canada.Ca | |
| Tel./*Téléphone* :  1-506-460-4511 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Dr. B. Bizimungu, Breeder and Res Scientist, Potato genetics and breeding, Fredericton  Mr. M. Haroon, Mol. Biol. Technician, Fredericton | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Professor H. Si, Gansu Agricultural University  Professor G. Chen, Fujian Agricultural University | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** : Many cultivars or advanced breeding lines of potato are very good in many aspects but still cannot be utilized on a large scale in potato production because these cultivars or lines have defects in one or few characters. If these cultivars or lines are used as parents in breeding crosses, the good characters will be largely lost due to genetic segregation in the progeny. Therefore, the ideal approach is to correct the specific defects through genome editing or somatic genome variation without significantly change other characters. We propose, therefore, this project of improving potato using soma-genomic approaches. This foreign research participant project will use genomic approaches. PhD students and visiting scientists will be able to learn genome-era technologies and required bioinformatics and get training in genomic and potato improvement research.  **Aligns with AAFC Science and Technology Priorities :**  This proposed research aligns with the AAFC departmental priority: “Support and improve the competitiveness and adaptability of the agriculture, agri-food and agri-based products sector”.  **Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  Potato is one of the most important food and vegetable crops in Canada and in the world. The knowledge and technologies developed during this research and the potential improvement of potato cultivars have the potential to greatly improve the potato quality, the storability, and the tolerance to drought or low nitrogen fertilizer. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The PhD students or visiting scientists should have some basic training in botany and molecular biology. Previous experience in working with potato or sweet potato is preferred, but not an essential requirement. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Guelph\_Gong, Joshua | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Control *Salmonella* infection in the gut** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-09-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-08-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) : Agri-Food and livestock* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( X ) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | One | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Guelph, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Joshua Gong**  Field of expertise / *Domaine d’expertise* : Gut microbiology | | | | E-mail/*Courriel* :  Joshua.gong@agr.gc.ca | |
| Tel./*Téléphone* :  1 226 217-8075 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  A Chinese university under the MOE-AAFC program (Specific university to be identified) | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Human salmonellosis is often associated with the consumption of poultry and pork products. The gut is the site where the infection is initiated. To reduce the risk of salmonellosis, prevention of *Salmonella* from colonization and invasion of the gut is essential. *Salmonella* deploys different strategies to use nutrients and to resist harsh and stressful conditions. Iron (Fe) is an essential and critical element required by the pathogen for metabolism and growth. Knowledge on the minimum requirement of Fe and how *Salmonella* regulates its intracellular Fe for survival would promote the development of efficient strategies to control the pathogen. *Caenorhabditis elegans* has been extensively used as a lab animal model to study micro-host interaction, including *Salmonella* infection. Using the nematode infection model by measuring its life-span, we recently identified probiotic candidates for *Salmonella* and enterotoxigenic Escherichia coli control and revealed a part of molecular mechanisms underlying the protection offered by the probiotic isolates. We propose to use this model system to determine the minimum requirement of Fe by *Salmonella* and also identify natural antimicrobial agents that can chelate or out-compete Fe to reduce *Salmonella i*nfection to the gut. The mechanisms underlying the effects of Fe and natural antimicrobials on *Salmonella* infection will also be investigated.  This proposal is under the projects of J-00034 and LOI# 1561.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  **Aligns with** AAFC S&T Priority #2: Enhance the quality of food and the safety of the food system.  **Anticipated impact :** generation of knowledge for the development of new strategies to minimise the incidence of salmonellosis. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| **Qualifications:** Expected qualifications include: 1) majored in microbiology, food science, or related disciplines; 2) basic training in lab skills/scientific thinking (experience in microbiology or molecular biology is a plus); 3) able to communicate effectively in English (verbal/written); 4) good computer skills for data analyses.  **Benefits:** The student will be trained to master the techniques for conducting proposed research. She/he will carry out data analysis and prepare scientific reports and manuscripts. She/he will also participate in experimental designs and group discussions on research planning and trouble shooting. Additionally, she/he can interact with other students, postdoctoral fellows, and researchers at both AAFC and University Guelph by attending seminars and giving presentations. All of the training will help the student to develop into an independent researcher with a well-prepared scientific mind and technical skills. Furthermore, the student can serve as a tie between AAFC and her/his home institution. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Guelph\_Lepp, Dion | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Assessment of Clostridium perfringens pili in vaccine development for controlling necrotic enteritis in chickens** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-05-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-04-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* (x), PhD/*Doctorat* (x) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 12-24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Guelph Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Guelph, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dion Lepp**  Field of expertise / *Domaine d’expertise* : Pathobiology/Genomics | | | | E-mail/*Courriel* : dion.lepp@agr.gc.ca | |
| Tel./*Téléphone* :  1-226-217-8127 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : Joshua Gong | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : John Prescott (University of Guelph) | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Objective/Objectif :  To characterize several novel C. perfringens genes involved in avian necrotic enteritis and assess their potential as vaccine candidates.  Value of the Opportunity (issue, results, outcomes)/Valeur ajoutée de l’opportunité (problème, résultats, retombées):  Necrotic enteritis (NE) is an economically important disease of poultry caused by Clostridium perfringens (Cp), which currently threatens commercial broiler production. NE is estimated to cost the poultry industry $US 2 billion per year world-wide and is the major target for dietary antibiotics. There is a global trend towards restrictions on the use of dietary antibiotics, and it is therefore urgent to better understand the pathogenesis and thereby develop novel control strategies for NE.  We have identified three novel NE-specific loci that encode a number of putative virulence factors and are largely plasmid-borne (Lepp, Roxas et al. 2010). A more comprehensive analysis using microarray comparative genomic hybridization identified several other loci more prevalent in strains originating from birds with NE, one of which encodes a putative pilus (unpublished data). There are a number of human and animal infections for which pilin subunits have proven to be effective vaccines, including urinary tract infection caused by uropathogenic E. coli (Goluszko, Goluszko et al. 2005; Serino, Moriel et al. 2010), neonatal meningitis by Streptococcus agalactiae (Margarit, Rinaudo et al. 2009), Pneumococcal infections by Streptococcus pneumoniae (Gianfaldoni, Censini et al. 2007) and post-weaning diarrhea in pigs by entertoxigenic E. coli (Van den Broeck, Cox et al. 1999). The development of an effective vaccine against poultry NE would represent a major advancement towards the control of this disease.  The scientific objectives of the research are: 1) To determine if C. perfringens strains associated with necrotic enteritis produce pili. 2) To assess the role of the pili in adherence. 3) To determine if pilin subunits are effective as protective antigens to control NE. All required expertise and techniques for the proposed research are available in the laboratories of the research team.  Gianfaldoni, C., S. Censini, et al. (2007). "Streptococcus pneumoniae Pilus Subunits Protect Mice against Lethal Challenge." Infect. Immun. 75(2): 1059-1062.  Goluszko, P., E. Goluszko, et al. (2005). "Vaccination with Purified Dr Fimbriae Reduces Mortality Associated with Chronic Urinary Tract Infection Due to Escherichia coli Bearing Dr Adhesin." Infect. Immun. 73(1): 627-631.  Lepp, D., B. Roxas, et al. (2010). "Identification of novel pathogenicity loci in Clostridium perfringens strains that cause avian necrotic enteritis." PLoS ONE 5(5): e10795.  Margarit, I., C. D. Rinaudo, et al. (2009). "Preventing Bacterial Infections with Pilus-Based Vaccines: the Group B Streptococcus Paradigm." Journal of Infectious Diseases 199(1): 108-115.  Serino, L., D. G. Moriel, et al. (2010). "Towards a vaccine against Escherichia coli-associated urinary tract infections." Future Microbiology 5(3): 351-354.  Van den Broeck, W., E. Cox, et al. (1999). "Induction of immune responses in pigs following oral administration of purified F4 fimbriae." Vaccine 17(15-16): 2020-2029.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This project aligns with the AAFC Science and Technology Priority to “Implement the Science and Technology Strategic  Direction to guide AAFC investment in support of a resilient and innovative sector” under the Strategic Objective to “Address Threats to the value chain: Improve gut health, reduce antibiotic use and develop alternatives to antibiotics in poultry production”.  Expected outcomes: 1) two scientific journal publications (SCI collected); 2) training of highly qualified personelle; 3) potential for the development of a novel NE control strategy. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Qualifications:  The expected qualifications include: 1) majored in microbiology or related disciplines; 2) basic lab skills/scientific thinking in microbiology/molecular biology; 3) able to communicate effectively in English (verbal/written); 4) good computer skills for data analyses.  Benefits:  The student will be trained in the required techniques, carry out data analysis and prepare scientific reports and manuscripts for publication. They will also participate in group discussions on research planning and experimental troubleshooting. All of this training will help the student to develop into an independent researcher. In addition the student will have the opportunity to interact with other students and researchers at AAFC and University of Guelph, and establish valuable contacts for future potential research opportunities/ collaboration. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Guelph\_Zhou, Ting | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Mitigation of Fusarium Mycotoxins by biodetoxification** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-05-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-04-30 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (x) * Visiting scientist / *Chercheur invité* **(** x **)** | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 12 - 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 2 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Guelph, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Ting Zhou**  Field of expertise / *Domaine d’expertise* : Mycotoxin / Microbiology | | | | E-mail/*Courriel* :  Ting.zhou@agr.gc.ca | |
| Tel./*Téléphone* :  1-226-217-8084 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : Prof. Keith Warriner, Prof. Peter Pauls, Prof. Paul Godwin, University of Guelph | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Prof. Fengxia Lu, Nanjing Agriculture University, China. | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Contamination of grains with fusarium mycotoxins, especially deoxynivalenol (DON), has long been a serious problem in Canada and other countries around world; recent data have shown that the problem of mycotoxin contamination is becoming more severe and widespread. New strategies are therefore very much needed for mitigating the unavoidable mycotoxin. The proposed research is built on the novel concept of detoxifying mycotoxins with naturally occurring microorganisms and their derivatives. In a previous project, a soil bacterial isolate was discovered to be capable of transforming DON to its stereoisomer, 3-epi-DON under aerobic condition, resulting in significant cytotoxicity reduction and toxicity reduction on lab animals. The DON epimerization not only is a new scientific discovery but also creates great potentials in mitigating DON risks in food chain. The proposed research is built upon the novel concept of detoxifying DON with beneficial microorganisms and/or their endogenous enzymes. The objectives are: 1). To study the conditions under which the mycotoxin detoxifying enzymes perform optimally and quantitatively compare their performance with other classes of DON detoxification mechanisms; the investigated enzymatic systems will span a couple of DON-related modifications including epimerization, acetylation and hydroxylation. 2). To adapt recombinant enzymes overexpression systems for enhancing the biotransformation efficiency of crude enzyme preparations. 3). To conduct both laboratory and pilot trials with actual corn and wheat products to explore the feasibility of incorporating the above enzymatic preparations within the wet-milling and processing of cereals. The proposed approaches will result in the development of innovative, highly-specific, environmentally green yet safe mycotoxin mitigation strategies. These proposed DON-detoxification strategies can be applied easily at different stages of food/feed processing chains. In addition, such interventions will provide multiple agriculture-related industries including grain production, food/feed processing, livestock and biofuel industries, with effective tools to proactively mitigate risks of mycotoxins.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The proposed research aligns with the Priority - to developed novel approaches to reduce the incidence of biochemical threats to the food processing supply chain. The research mainly investigates the use of novel bacterial enzymes to control the presence/transfer of naturally produced biochemicals (mycotoxins) to processed foods/cereals intended for human consumption.  The proposed research will result in the development of innovative mycotoxin mitigation strategies that endure consumer acceptance. These proposed DON-detoxification strategies can be applied easily at different stages of food/feed processing chains. In addition, such interventions will provide multiple agriculture-related industries including grain production, food/feed processing, livestock and biofuel industries, with effective tools to proactively mitigate risks of DON, thus reducing food-safety risks and increasing consumer confidence with Canadian agricultural products as well as strengthening the economic returns of these industries. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The candidate will pass one of the requested English tests and be efficient in both oral and written communications in English. The candidate is expected to have substantial experience in a lab related to the research area of mycotoxin, molecular biology, biochemistry/enzymology, microbiology or a field relevant to the proposed research.  The candidate will join the multidisciplinary team and make contribution to the comprehensive research project with emphasis on one or two of the objectives, while be trained to master the techniques for conducting the proposed research and gain experience in experimental designs, data analysis, preparation of scientific reports and manuscripts. In addition, the candidate will have opportunity to expose to facilities and expertise at AAFC and Canadian universities and to interact with other students, postdoctoral fellows, and researchers for developing potential future collaborations. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Harrow\_Yang, Jingyi | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Using crop soil models to simulate soil C N and water cycle in plant, soil, water and atmosphere systems at field and regional scales** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-12-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-11-30 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | **Agri-Food */ Agroalimentaire*** | Biodiversity and Collections) / *Biodiversité et collections* | |
| **Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes*** | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Harrow Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Harrow, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Jingyi Yang**  Field of expertise / *Domaine d’expertise* : Modelling crop-soil nutrient cycle in Agroecosystems | | | | E-mail/*Courriel* :  Jingyi.yang@agr.gc.ca | |
| Tel./*Téléphone* :  519-738-1270 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Dr C.F. Drury, Dr X.M. Yang at Harrow Ontario, Dr Ted Huffman at Ottawa Ontario | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : Dr Wanhong Yang (Geography Department, University of Guelph, Ontario, Canada) | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : Dr. Gerrit Hoogenboom (Washington State University, USA); Dr. Ping He (Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China) | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** : The Soil and Environmental Team at Harrow Research Center uses different models to monitor Agri-Environmental Health. The objective of this project is to evaluate crop and soil models to simulate soil C, N and water cycling in agricultural land. Cropping system models under Decision Support System for Agrotechnology Transfer (DSSAT) and GHG emission model DNDC will be use to simulate crop production (biomass, yield), soil water and C/N dynamics (N2O, NH3, NH4 andNO3) at various field cropping and rotation systems in China or in Canada (i.e., fertilizer N rates or cultivar or density experiments in maize, wheat, potato, barley and soybean, canola etc). The Canadian Agricultural Nitrogen Budget (CANB) model is available to simulate Reactive N (NH3, N2O, NO3) in a regional scale.  The simulated results will be evaluated using the measured experimental data. The validated model will be used for precision agriculture, minor-use of fertilizer, scenario analysis of N2O and NH3 emissions, soil nitrate N leaching to river and ground water as well as policy scenario analysis etc.  Benefit to AAFC:  The PhD project will provide a validated crop-soil model available for use in Canadian farmland for researches. Several peer reviewed journal publications will be produced and enhance AAFC scientific researches.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This proposal aligns with AAFC Science and Technology Priority #1 –  Understanding chemical, physical and biological processes that lead to N and P losses from agricultural lands, water systems and atmosphere and developing diagnostic tools that allow us to identify soils at risk and practices that can mitigate the losses.  Environmentally sustainable soil nutrient management has been a long-term research goal for producers, scientists and policy makers. Because of the complexity of the issue as well as limited resources, modelling approaches are being used at varying scales to help identify both the problem areas and the possible solutions to ensure that both productivity and environmental health are maintained. For example, over N fertilization causes NO3-N leaching & runoff losses. The optimized N application rates, best crop cultivar and density selections can reduce nutrients loss, enhance soil fertility and achieve the maximum and economic yield. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The candidate should be a currently registered PhD student in China or in Canada in soil and environmental science, agronomy, plant science or other related sciences and have good knowledge of mathematics and statistics. Computer use and programming skills would be desirable assets.  The student will complete most of his/her PhD thesis, and benefit from this program by obtaining (1) up-to-date knowledge on crop simulation models, (2) skills for testing and validation of simulation models and 3) improved English communication skills through interaction with soil scientists at Agriculture and Agri-Food Canada. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Kentville\_Fan, Lihua | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Investigation of heat-resistant bacteria and/or fungi to ensure food safety and quality** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-10 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-10 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* (X) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 12-24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | One Ph.D student and/or one visiting scientist | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Kentville Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Kentville, Nova Scotia | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Lihua Fan**  Field of expertise / *Domaine d’expertise* : Food Microbiology | | | | E-mail/*Courriel* :  [Lihua.fan@agr.gc.ca](mailto:Lihua.fan@agr.gc.ca) | |
| Tel./*Téléphone* :  902-365-8565 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Spoilage caused by heat- resistant bacteria and fungi has been reported repeatedly. These heat-resistant microorganisms usually contaminate fruits on or near the ground and survive heat treatments used for fruit processing. They can grow and spoil the products during storage at room temperature, which results in great economic losses.  Most common heat-resistant bacteria are *Alicyclobacilli* spp, while fungi species in fruit and fruit product disintegration are *Byssochlamys fulva*, *Byssochlamys nivea*, *Neosartorya fischeri*, *Talaromyces flavus*, and *Eupenicillium brefeldianum*. The heat resistance is attributed to the formation of spores which have a wide range of heat resistance, depending on species, strain, age of organism, heating medium, pH, presence of sugars, fats and acids in heating medium, and growth conditions. Heat-resistant bacteria and fungi present a serious safety and quality issue in processed products like fruit juice, preparation and jam. To date, the mechanisms of thermo-resistance have not been fully explored. The objectives of this project are: 1. Isolate and identify heat-resistant bacteria and/or fungi species from raw processing materials; 2. Investigate the activation of heat- treatments and establish heat treatment time and temperature conditions (D and Z values) on selected heat-resistant bacterial and/or fungal spores; 3. Conduct a series of challenge tests on heat-resistant bacterial and /or fungal spores and tissues; 4. Investigate the mode of action of heat treatments on heat-resistant bacterial and /or fungal spores. In addition to *in vitro* testing, this project will also work on: i). Evaluation of microbial quality of processed product including total plate counts, yeast and molds counts, and heat-resistant bacteria and/or fungi; ii). Investigation of processing technology on microbial reduction and product quality; iii). Verification of pasteurization temperature (at industrial settings) for the safety and quality of processed food products as well as study of product shelf life.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The proposed research aligns well with AAFC science and technology priorities. The research will contribute to enhance the quality of food and the safety of the food system, enhance new opportunities for agriculture from bioresources and enhance human health and wellness through food, nutrition and innovative products. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Qualifications:  Ph.D student or visiting scientist studying or working in Food Science and/or Microbiology areas with excellent knowledge in microbiology, food science and technology, and biochemistry will be considered. The candidates are preferable having research experiences in food safety and quality and natural antimicrobials.  Benefits to the candidates:  The candidates will get hands-on training from AAFC scientists. This Joint Research program at AAFC laboratories provides the candidates with a good opportunity to learn and apply state-of-the-art technologies to their current and future research. The new technical skills and knowledge will also be the valuable assets for the candidates for their professional career development within the Agri-Food industry. This Joint Research program at AAFC laboratories also bridges the scientists at AAFC and foreigners for their potential collaborations in the future. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Kentville\_Song, Jun | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Quantitative proteomics and metabolomics approaches to study insect resistance of tree fruit rootstocks** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-12 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-12 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* ( X ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 12-24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | One Ph.D student and/or one visiting scientist | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Kentville Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Kentville, Nova Scotia | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Jun Song**  Field of expertise / *Domaine d’expertise* : Postharvest physiology and proteomics | | | | E-mail/*Courriel* :  Jun.song@agr.gc.ca | |
| Tel./*Téléphone* :  902-365-8497 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  The sustainability of tree-fruit production systems in Canada will be challenged in the future by greater impacts of key pests such as aphids and nematodes interacting with increasingly variable abiotic stresses associated with climate change. Dwarfing rootstocks with restricted root systems are being used to establish intensive, high-density orchards of high-value cultivars such as ‘Honeycrisp’ apple and ‘Skeena’ cherry. While potential returns from such plantings far exceed those for lower density orchards, they are significantly more expensive to plant and the economic risks of poor establishment and low early returns resulting from pest impacts are significant. This project will use modern innovative methods (proteomics and metabolomics tools) to reveal the mechanisms underlying rootstock resistance to aphids and nematodes in apples. Characterization of this variation in resistance, elucidation of the underlying mechanisms, and identification of molecular-genetic markers of resistance to these pests would yield significant benefits for the tree-fruit industry in Canada. New knowledge of rootstock resistance to aphids and nematodes will enable Canadian tree-fruit growers to select rootstocks that will optimize their ability to establish more productive and resilient orchards despite increased pest pressures associated with the loss of chemical control options and climate change. Identification of genetic markers of resistance will open the door for more efficient selection of superior rootstocks. New knowledge of the role of nutrition via phloem components in scion resistance/tolerance could lead to novel approaches for managing aphid populations, possibly targeting gut symbionts or the manipulation of host nutrients. New knowledge of the influences of nematodes on above-ground responses to stress will help refine approaches for integrated tree health management in addition to aiding in the elucidation of the genetic basis of stress responses.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The proposed research aligns well with AAFC science and technology priorities. The research will contribute to enhance the quality of food and the safety of the food system and enhance new opportunities for agriculture from bioresources. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Qualifications:  Ph.D student or visiting scientist studying or working in plant physiology, postharvest, genomics areas with excellent knowledge in plant science, horticulture, entomology and biochemistry will be considered. The candidates are preferable having research experiences in horticulture, genomics, entomology and plant physiology.  Benefits to the candidates:  The proposed research will be conducted by a multi-disciplinary team from across the country including research expertise from AAFC, NRC and universities. The research team has extensive experience in this field of research and is networked with other experts. Therefore, candidates will have unique opportunity to learn and gain experience on all most technical developments from chemistry, biochemistry, genomics, proteomics, and metabolomics. With the fundamental research equipment and facilities required to conduct this research are all available, including LC/MS (proteomic), GC/MS, HPLC, PCR, RT-PCR, gel electrophoresis, field plots, cold storage rooms and postharvest storage facilities. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Lacombe\_Juarez, Manuel | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Development of decision making tools for sustainable beef production in Canada** | | | | | |
| Start date (yyyy-mm-dd)/Date de début (aaaa-mm-jj) :  2015-01-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2017-12-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* (X), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* (X) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 4-12 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1-2 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Lacombe Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Lacombe, Alberta | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Manuel Juárez Davila**  Field of expertise / *Domaine d’expertise* : Livestock Phenomics | | | | E-mail/*Courriel* : manuel.juarez@agr.gc.ca | |
| Tel./*Téléphone* :  +1-403-782-8118 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : Jennifer Aalhus, Oscar Lopez Campos, Nuria Prieto | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : John Basarab (AARD) | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Using information from the herd at AAFC-Lacombe collected during 15 years of research studies in animal performance, carcass and meat quality (~5,000 full phenotype records) and the private database from the cattle management software HERDTRAX (~40,000 full records, including carcass merit traits), we will develop an efficient toolbox to provide producers with an integrated decision approach to optimizing production systems with alternatives to balance environmental, social and economic factors within their operations. A cow breeding sorting tool and two feeder cattle sorting tools, for individual and group selection, will be develop by integrating advanced bioinformatics with genetics, animal production, nutrition, marketing and economics. Users will be able to compare different scenarios by selecting production factors and uses/markets and the system will predict individual or group animal performance, carcass merit traits, GHG emissions and profitability. After these tools have been developed and validated using historical information, a second phase of the project will aim to validate the system by working with a smaller experimental at AAFC-Lacombe under different management conditions, and two larger commercial herds within the HERDTRAX population. The development of the data-based decision making tools aligns with industry and government research priorities and will help to solidify Canada’s leadership in sustainable beef production.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This project aligns directly with objectives 1 (Increase agricultural productivity) and 2 (Enhance environmental performance), as the main goals are to increase productivity and enhance environmental performance of bee production by optimizing the use of resources. It will also generate new opportunities for the beef industry, by positioning Canada as one of the leaders in sustainable beef production, addressing the impact of other beef producer countries on Canadian beef internal and external markets. Within the Beef and Forage Sector, this study will contribute to Objective 1 by improving animal feed efficiency and by advancing in new technologies in animal breeding and production by optimizing the use of resources. At the same time, it will cover both goals within the Objective 2, by including economic evaluation of market driven sustainability metrics and by providing farmers with tools to reduce the environmental impact of beef production.  Canada, as the only beef producer country in North America with a national and validated traceability system, is in the best position to lead the production of sustainable beef in the region. McDonald’s has chosen Canada for its pilot study in this field. This study will contribute to this goal by creating integrated tools to maximize all three pillars within the definition of sustainable beef production. Partnering with international institutions will strengthen the validity of the models. Canada will get the best position in this new scenario where information management and use of new technologies have been identified as key elements. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Background in animal science and/or quantitative genetics, and advance knowledge of statistical analysis. The candidate will collaborate with a multidisciplinary team and will benefit by working in an emerging field, sustainability. The candidate will have the opportunity to access highly-valuable data regarding genetics, animal performance, carcass merit traits and meat quality. Scientific publications will include the name of candidate based on his contribution. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Lethbridge\_Hao, Xiying(1) | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Rangeland soil health under cow-calf beef production** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-09-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-09-01 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 18-24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Lethbridge Research and Development Centre  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Lethbridge, Alberta | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Xiying Hao**  Field of expertise / *Domaine d’expertise* : Soil Science | | | | E-mail/*Courriel* :  Xiying.hao@agr.gcc.a | |
| Tel./*Téléphone* :  +1-403-317-2279 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Don Thompson, Newton Lupwayi | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* :  Cameron Carlyle, University of Alberta | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Mengli Zhao (Inner Mongolia Agricultural University, China) | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Two experiments will be conducted using the long-term grazing trials at Stavely, AB to investigate the effects of long-term heavy grazing on rangeland soil health. We will also take advantage of an existing 15 year study of recovery of plant communities from heavy stocking rates to determine the resilience of soil health after grazing is removed. Some of the response variables to be measured include: *soil physical*:  aggregate stability, bulk density,  compaction,  volumetric moisture content, surface  temperatures, thermal diffusivity, water infiltration rates; *soil chemical*: CEC, pH, light fraction C, available N, P, K, total C and N; *soil biology*: microbial biomass (soil microbe C), microbial enzyme activities (involving C, N, P, and S cycling) microbial diversity (next generation DNA sequencing) and *plant responses*: root productivity, aerial biomass, plant community composition, and N uptake.  This study will apply the concepts of soil health to rangeland and determine which soil characteristics are most affected by cattle grazing.  Knowledge the role of microbes in maintaining and restoring rangeland soil health will be greatly expanded.  The resilience of unhealthy rangeland soil will be determined.  BMP’s will be developed to improve rangeland soil health.  Access to productive rangelands provides a competitive advantage to the Canadian beef industry by supplying nutritious and low cost forage. The estimated annual value of grazing rangeland in AB and SK exceeds 180 million dollars. Improved plant vigour and soil moisture conservation due to optimal litter cover is expected to reduce these fluctuations and improve overall yield by greater than 10%. The concept of soil health has not been promoted for rangeland but overlaps well with the concept of range health which is widely accepted by the ranching community. This study will lead to renewed interest in range soils. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| **Qualification**:  The candidate should be enrolled in a Ph.D. program and have training in either soil science or rangeland ecology.  **Benefits to the candidate**:  The candidate (new Ph.D. student) will interact and work side-by-side with other researchers in this group and gain first-hand knowledge on how to conduct rangeland soil health research. This includes learning the logistics of designing and planning rigorous scientific field experiments. The candidate will learn how to determine the physical, chemical and biological soil properties used in determining rangeland soil health. These include field measurement as well as laboratory analyses. The candidate will learn data management, record keeping and statistical analysis. Finally, the candidate will learn how to write scientific papers in English for publication. The project will continue collaboration between China and Canada in the areas of rangeland and soil science. These trainees could be our research collaborators for many years to come. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Lethbridge\_Hao, Xiying(2) | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Novel livestock manure and compost for soil health** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-11-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-11-01 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Lethbridge, Alberta | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Xiying Hao**  Field of expertise / *Domaine d’expertise* : Soil Science | | | | E-mail/*Courriel* :  Newton.Lupwayi@agr.gcc.a | |
| Tel./*Téléphone* :  +1-403-317-2279 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : **Newton Lupwayi** | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* :  Brandon Gilroyed, University of Guelph | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Xiaojun Shi (Southwest University, Chongqing, P.R. China) | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  The use of 3-nitroxypropanol (NOP) in cattle diets significantly decreases enteric CH4 emission from beef cattle. However, the scientific understanding of NOP stops upon manure excretion. The persistence of NOP in the environment and how NOP affects manure decomposition, N and P availability, and GHG emissions is poorly understood. A field trial will be conducted at Lethbridge, Alberta and NOP manure and compost will be land applied for forage feed (sainfoin or alfalfa-broom mix) production over 2 growing seasons. This project will demonstrate whether NOP manure/compost application affects forage yield, feed quality (protein, starch, fiber and mineral content), and rate of N & P removal from soil, along with microbial community and enzymatic activity ,soil C storage and N & P availability and greenhouse gas emission following NOP manure and compost application. Additionally we will assess soil health at the end of two years using following Cornel Soil Health Assessment Manual that includes physical property (soil aggregate stability and available water capacity), chemical property (soil pH, plant available nutrients (KCl-extractable NO3 and NH4, Olsen-P and pH 7.0 ammonium acetate extractable K, Ca, Mg, Mn and Zn)) and biological property (organic matter and active C, potentially mineralizable N content, and root health rating) assessment. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| **Qualification**:  The candidate should be enrolled in a Ph.D. program and have training in either soil science.  **Benefits to the candidate**:  The candidate (new Ph.D. student) will interact and work side-by-side with other researchers in this group and gain first-hand knowledge on how to conduct soil research. This includes how to design and plan the logistics to conduct rigorous scientific experiments. The candidate will learn how to determine the physical, chemical and biological soil properties used in derived the rangeland soil health indicator. These include field measurement as well as laboratory analyses. The candidate will learn data management, record keeping and statistical analysis. Finally, the candidate will learn how to write scientific papers in English for publication. The project will contribute to collaboration between China and Canada. These trainees could be our research collaborators for many years to come. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Lethbridge\_Yang, WenZhu | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Use of exogenous enzymes to improve nutritive value of crop residues by ruminants** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-10-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-9-30 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* **Beef and Forage** | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( x ) * Visiting scientist / *Chercheur invité* ( x ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | |  | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Lethbridge, Alberta | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Wen Zhu Yang**  Field of expertise / *Domaine d’expertise* : Ruminant nutrition | | | | E-mail/*Courriel* :  wenzhu.yang@agr.gc.ca | |
| Tel./*Téléphone* :  +1-403-317-3427 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Dr. Tim McAllister | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : Elanco Canada | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  The dry growing conditions experienced this past year in North America have made it clear that animal agriculture must find alternative, cost-effective feed ingredients to remain profitable at food production. Crop residues such as barley and wheat straw can fulfill this need if effective digestion can be obtained. Feed enzyme additives offer a possible means of increasing fiber digestion as enzyme additives contain concentrated enzymatic activities that are involved in degrading fiber. Recently some second generation enzyme products were shown when added to the dairy feeds to increase milk efficiency.  The objective of the project is to identify enzyme additives that consistently increase in vitro ruminal digestibility of targeted crop residues, and then to evaluate the effects of enzyme selected on in vivo digestibility. The enzyme candidates will be obtained from the project. The key enzyme activities of cellulase and xylanase will be measured at rumen conditions. Barley and wheat straw will be tested as substrate. The enzyme-feed combinations will be assessed using a batch culture at incremental dosage to screening the best enzyme products and application rate. The best enzymes and dosages for the various feeds will be further evaluated in the rumen simulation technique that more accurately reflects in vivo ruminal digestion kinetics. Finally, animal metabolism studies will be conducted in lambs to assess the effects of the most promising enzymes for the crop residues on total tract fiber digestion. This research is anticipated to identify specific feed enzyme additives that can be used to improve fiber digestibility of crop residues, and to transform wheat and barley straw into a higher value feedstuff.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This research is relevant to AAFC priorities: 1) enhancing economic benefits for all stakeholders; and 3) enhancing environmental performance of the Canadian agricultural system. The Canadian cattle industry would benefit greatly from the availability of feed from currently under-utilized straw that could provide a substantial portion of the dietary nutrients. Securing enhanced economic value for straw is of significant importance to producers. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The potential graduate student will become a member of our integrated research team and is expected to have an in-depth knowledge of biochemistry, ruminant nutrition, and biotechnology. The student will be expected to: 1) use in vitro, in vivo and molecular techniques as research tools to determine enzyme activities, and to assess the effects of enzyme supplementation on rumen fermentation, rumen microbial population and feed digestion; 2) participate and learn diverse methods of data entry and statistical analysis and report results in both scientific conferences and peer-reviewed journals; and 3) work effectively under minimum supervision. The proposed work would allow the student to get acquainted with research activities at a Canadian National Research Laboratory. The student will be trained to establish a database and to write scientific papers in peer-reviewed journals and present the data at national or international scientific conferences. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | London\_Tian, Lining | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Develop disease resistant crops using genome editing approach** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-09-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-08-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X ) * Visiting scientist / *Chercheur invité* ( X ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 2 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  London, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Lining Tian**  Field of expertise / *Domaine d’expertise* : Plant molecular biology and plant biotechnology | | | | E-mail/*Courriel* :  Lining.tian@agr.gc.ca | |
| Tel./*Téléphone* : 519-953-6714 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Genome editing or genome engineering is to use genomics information and molecular approaches to modify endogenous genes and is a new and powerful method to modify crop traits. The trait generated via genome editing technologies do not require the presence of transgenes and selectable markers once the DNA is delivered into plant cells and execute their function in altering target gene sequences. The plants with new traits can be transgene-free and mutations induced by genome editing are no different from natural mutations. The genome editing will be used to develop disease resistance in soybean and apple. Soybean cyst nematode (SCN) (*Heterodera glycines* Ichinohe) is the most devastating pest of soybean crop in the world including Canada and the disease causes more yield losses than any other soybean diseases. Once SCN infects a soybean field, it becomes difficult to be eliminated. Growing soybean plants that are genetically resistant to SCN is a desirable method and long-term solution to the disease. Research has shown a number of soybean genes are negatively involved in SCN infection to soybean plants. We will conduct research to develop soybean plants that are genetically resistant to SCN via genome editing approach. Fire blight (*Erwinia amylovora*) is a major disease of apple. There is no true immunity to fire blight in cultivated apple. The disease causes significant losses to fruit production world-wide. Several apple genes have been identified to involve in fire blight infection. We will employ the genome editing technology to site-specifically modify the specific genes in apple to create fire blight resistant plants.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This study aligns with departmental science and technology priority 4: Enhancing economic benefits for all stakeholders, and priority 3: Security and protection of the food supply (through crops resistant to pests and diseases). Soybean plants developed can be used widely in crop fields where SCN is prevailing. The outcome of the study is important for sustainable crop production and the benefit of the research will be significant. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The candidates should have good academic standing during the university studies and should have good knowledge in plant molecular biology, biochemistry, plant physiology and biotechnology. The candidates should be familiar with basic laboratory techniques and skills in biology research. Effective communications skills in English are important.  Through conducting the research, the candidates will acquire new knowledge in plant molecular biology and plant biotechnology. The candidates will learn various useful techniques in plant genome editing and plant molecular biology. After the project, the students will obtain good knowledge, skills and capability to conduct research in related areas. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | London\_Yuan, Ze-Chun | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Exploit plant growth promoting bacteria to improve crop production, disease management and agricultural sustainability.** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-04-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2020-03-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( X ) * Visiting scientist / *Chercheur invité* (X) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 1-4 years |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | |  | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.schulich.uwo.ca/microbiologyandimmunology/research/research_areas/hosted_yuan.html>;  <http://www.agr.gc.ca/eng/science-and-innovation/research-centres/ontario/southern-crop-protection-and-food-research-centre/scientific-staff-and-expertise/yuan-ze-chun-phd/?id=1306946921072> | | | | City/*Ville*, Province :  London, Ontario, Canada | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Ze-Chun Yuan**  Field of expertise / *Domaine d’expertise* : microbial genetics, applied microbiology and biotechnology, genomics, plant stress response, transcriptomics, metabolomics. | | | | E-mail/*Courriel* :  ze-chun.yuan@agr.gc.ca | |
| Tel./*Téléphone* :  1-519-953-6641. | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Dr. Yu-hai Cui, Dr. Abdelali Hannoufa. | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* :  Dr. Trevor Charles at Dept. of Biology, University of Waterloo; Dr. Turlough M. Finan at McMaster University (Dept. of Biology). | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Dr. Carlos J. Becquer (Cuba); Dr. Hezhong Wang (China); Dr. Hongyan Liu (China); Dr. Zhenli He (USA); Dr. Cargele Masso (IITA, Africa); Dr. Eugene W. Nester (USA). | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Soil microbiomes not only decompose organic matter to contribute to the recycling of chemicals and nutrients that enhance soil fertility, but also suppress crop pathogens and pests. An increased knowledge of phytomicrobiomes and their associations with plants could be exploited for sustainable agriculture and ‘greener’ industry with reduced environmental footprint. We are studying plant associated microorganisms capable of promoting plant growth, suppressing crop diseases and pests and degrading biomass. My lab isolated and characterized several bacterial strains including Paenibacilus polymyxa CR1 with great potential as a biopesticide, biofertilizer and bio-product producer. We recently finished the genome sequencing and analysis of P. Polymyxa CR1 and conducted the comparative genomics analysis, see PubMed: <http://www.ncbi.nlm.nih.gov/pubmed/?term=Ze-Chun+Yuan> .  With the ever increasing concern over economic development and environmental sustainability, my lab intends to use our expertise of microbial genetics, genomics and bioengineering to improve microbial function and performance to enhance soil fertility and crop health or increase the production of value-added products (chemicals and biofuels), aiming at boosting the bioeconomy. Our ongoing and future researches including: 1) characterizing bacterial metabolic pathways involved in degrading lignocellulose (lignin, cellulose and hemi-cellulose) and producing value-added products; 2) understanding molecular plant-microbe interaction and plant stress responses; 3) developing bacterial inoculants to promote plant health and disease suppression. Our researches involve several ‘omics’ technologies including transcriptomics (RNA-seq), metabolomics, next generation sequencing, functional genomics as well as high through-put screen approach.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  Our research will develop integrated management strategies that enable growers to dramatically reduce the risk of crop disease. Our researches take advantage of natural chemicals and biological means that reduce the use of toxic chemical pesticides. Thus, our research responds to Departmental Mandate Priorities of competiveness and innovation, because our research will increase scientific capacity and knowledge to support the agriculture and agri-food sector with enhanced productivity and food quality, reduced environmental footprint and enhanced economic benefits and profitability. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The successful candidate will be a highly motivated, productive individual with ambition to pursue high quality researches within a team of scientists, technician, graduate students and postdoc fellows on the topics of plant-microbe (bacterium) interactions as well as biomass degradation, biofuel and bioproducts (biopesticides and biofertilizers). Candidates should have basic training in microbiology or plant physiology, bioinformatics and molecular biology. We especially welcome applicants from joint Ph.D program and visiting scholars for collaborative researches.  The individual will gain further training and experience in microbial genetics, genomics, plant physiology, molecular biology, bioengineering, next generation sequencing and various ‘omics’ technologies, which are in high demand in both the academic and industry sectors. The candidate is expected to publish researches in refereed journals and present research findings at scientific meetings. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Ottawa\_Fernandez-Triana, José | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Systematics of braconid wasps (Hymenoptera) in China and Canada** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-04-15 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-04-15 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* (X) * Visiting scientist / *Chercheur invité* (X) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 3-12 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 7 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Ottawa Research and Development Center  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Ottawa, Ontario | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Jose Fernandez-Triana**  Field of expertise / *Domaine d’expertise* : Entomology, parasitoid wasps | | | | E-mail/*Courriel* :  Jose.Fernandez@agr.gc.ca | |
| Tel./*Téléphone* :  613-759-1034 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Peter Mason | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* :  Henri Goulet | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* :  Xue-xin Chen (Zhejiang University, China); Kees van Achterberg (Naturalis, The Netherlands); James Whitfield (University of Illinois, US); Mark Shaw (National Museums of Scotland, UK). | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Microgastrinae (Hymenoptera, Braconidae) are the most important group of parasitoid wasps attacking caterpillars and one of the most diverse, with some 500 described species known from China and Canada altogether. They are one of the most important and used biocontrol agents in agriculture and forestry. However, hundreds of undescribed species need to be described, and the biogeographical relationships between Canada and the Eastern Palaearctic (including China) have never been explored. This project will be the first to comprehensively analyze the fauna of these two countries as a basis for future work and collaboration. The Canadian National Collection of Insects (CNC) has the collection resources and expertise to study this group of wasps, as well as a significant number of specimens collected in the past few years that remain unidentified; the Chinese counterpart also has a rich collection that merits further examination. Morphological, biological, and molecular (DNA barcodes) data will be used in an integrative way to prepare several taxonomic revisions, which will be published in peer-reviewed journals at the end of the project. A significant number of new species and new biogeographical relationships between North America and Asia will be uncovered during the process. This project directly links to ongoing research done by the AAFC supervising scientist at the CNC (on the Holarctic fauna of Microgastrinae) and it will translate in new knowledge of potential candidates for biological control of agriculture pests that are relevant to Canada and/or China.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The proposed research directly supports priority A16: it will improve our capacity to identify beneficial invertebrates and to monitor and predict their incidence and movements, including prediction and mitigation of the risks they pose. The knowledge generated will be broadly disseminated in open-access scientific publications and publicly accessible internet websites. AAFC is the only entity in Canada which can uniquely address issues relevant to the taxonomy of beneficial arthropods associated with agriculture. Global trade and climate change are the source of new challenges for Canadian agriculture which cannot be addressed by other research sectors such as industry or universities.  The proposed research is essential to keep the Canadian agricultural sector globally competitive and sustainable. The negative effects of invertebrate pests cost the agricultural sector millions of dollars annually and many of the worst pests in Canada are invasive from Europe and Asia. The best, most environmentally sensible, long-term solution to help mitigate these negative factors is to be able to identify invertebrates quickly and correctly so that strategies can be implemented to ensure that productivity is maximized. Knowledge of the braconid fauna of China will enhance capacity to identify potential solutions for new invasive pests and understanding these species requires specialized training and a world-class reference collection. The outputs will allow identification of beneficial species that are likely to reduce the impact of new pests invading Canada. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The participants have extensive experience in systematics of parasitoid wasps, biocontrol research, and ecological studies of host/parasitoid relationships, including dozens of publications on the topic and the description of hundreds of new species. Additionally, the CNC hosts the largest collection of Microgastrinae worldwide, and the proposed Chinese institution hosts one of the largest collections of parasitoid wasps in that country – and is a strong component of the graduate student’s research. The collaboration will benefit all participant institutions while providing training opportunities, enrichment of the involved entomological collections (via exchanging of specimens), and generation of significant new knowledge and publications on the topic. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Sherbrooke\_Ibeagha-Awemu, Eveline(1) | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Understanding the genetic bases of lactation persistency** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-09-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-08-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( x ) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | |  | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Sherbrooke, Quebec | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Eveline Ibeagha-Awemu**  Field of expertise / *Domaine d’expertise* : Animal Genomics | | | | E-mail/*Courriel* :  Eveline.ibeagha-awemu@agr.gc.ca | |
| Tel./*Téléphone* :  +1-819-780-7249 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : Dr. Pierre Lacasse, Dr. Nathalie Bissonnette | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  The current dairy practices of maximising peak daily output and minimising calving interval have evolved from the 1930s onward to meet the immediate priority of food scarcity and the associated long term goal of genetic improvement. Very high daily milk yields are associated to metabolic diseases and lead to the specific problem of drying off late lactation cows still producing more than 30 kg/d. Therefore, minimising the proportion of lifetime spent in early lactation by extending would be a worthwhile strategy for improving the longevity and welfare of dairy cows. The Estimated Breeding Values (EBV) for lactation persistency reflect the average daughter milk yield expected at day 280 in lactation compared to day 60 in lactation calculated as percentage weighted for the three lactations ([Canadian Dairy Network 2004](#_ENREF_3)), Although EBV for lactation persistency is available since 2000, no direct selection has been applied so far. Improved LP is considered a good alternative method for increasing overall milk production because it does not cause the negative energy balance and other health issues for cows. However, little is known about the biology of LP. We aim to identify markers associated with lactation persistency to improve the genetic gain associated to this trait. Consequently, we have used the 50KSNP beadchip in a genome wide association study (GWAS) and identified significant SNPs for LP on Bta 16 (68.2-71.2 Mega base pairs (Mb), Bta 3 (14-16 Mb), BTA 5 107-109 Mb) and Bta 1 (133-137 Mb). We wish to (1) fine map these regions to identify the possible causal variants of LP and (2) using next-generation RNA sequencing to identify the molecular pathways and genes associated with enhanced LP. Such variants could be included in breeding programs for LP.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The proposed research will contribute to three priorities outlined by the Dairy Farmers of Canada/AAFC: animal health, animal welfare and reproduction, milk biosynthesis and genetic improvement and genomics. This research will help dairy producers to adopt shorter dry period by reducing the negative impacts on the following lactation thereby increasing milk yield and farm profits. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Master’s degree in animal science, biochemistry, genetics, biology, molecular biology, biotechnology, microbiology or related topics.  The potential candidate should have knowledge of current concepts, theories and principles of genetics/genomics and  strong skills in molecular genetics (e.g. PCR, real time PCR, molecular cloning, nucleic acids purification, transfection, cell culture, western blot, ELISA, etc). Ability to prepare or willingness to learn how to prepare libraries for next generation sequencing. Experience in mining bioinformatics data bases and to use bioinformatics tools. Ability/willingness to manage and analyze next-generation sequence data. Ability to make observations, accurately gather and record data as well as interpret and conduct statistical analysis of results.  Ability to draft reports, technical bulletins and scientific posters, and contribute to the production of scientific communications. Ability to work in a team and to communicate effectively in English. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Sherbrooke\_Ibeagha-Awemu, Eveline(2) | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Regulatory roles of non-coding RNA in the pathogenesis of bovine paratuberculosis** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-09-01 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-08-31 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( x ) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | |  | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Sherbrooke, Quebec | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Eveline Ibeagha-Awemu**  Field of expertise / *Domaine d’expertise* : Animal Genomics | | | | E-mail/*Courriel* :  Eveline.ibeagha-awemu@agr.gc.ca | |
| Tel./*Téléphone* :  +1-819-780-7249 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* : Dr. Nathalie Bissonnette | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  *Mycobacterium avium* subspecies *paratuberculosis* (MAP), is the causative agent of paratuberculosis in ruminants. MAP secretes substances into the serum of infected animals that affect their ability to produce an effective immune response. In this study, the content of these microparticles (MPs) will be studied under infection conditions (*in vitro* and *in vivo*). Dr. Nathalie Bissonnette’s laboratory is interested in the functions of macrophages (immune cells) and their MPs in bovine paratuberculosis. Dr. Ibeagha-Awemu’s lab is interested in non-coding RNA (microRNAs/long non-coding RNA) and their role in genome activity. MPs are vesicles (100-1,000 nm in diameter) that are released by activated macrophages. Because of the material they contain (nucleic acids, proteins, lipids), MPs can play a role in cellular communication and can modulate the functions of cells with which they interact. The objectives of this study are to (1) investigate the role of non-coding RNA (especially microRNA/long non-coding RNA) on internal communication of cells under conditions of mycobacterial infection (bovine paratuberculosis); (2) identify biomarkers with high potential for the identification of bovine paratuberculosis and (3) contribute to the understanding of the immune disorder caused by the pathogen.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  The present research aims to identify accurate genetic information and comprehensive understanding of host-pathogen interaction in MAP resistant cows. Improvement of host disease resistance using strong markers for genetic selection is a winning strategy for both the dairy industry and consumers. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| Master’s degree in animal science, biochemistry, genetics, biology, molecular biology, biotechnology, microbiology or related topics.  The potential candidate should have knowledge of current concepts, theories and principles of genetics/genomics and  strong skills in molecular genetics (e.g. PCR, real time PCR, molecular cloning, nucleic acids purification, transfection, cell culture, western blot, ELISA, etc). Ability to prepare or willingness to learn how to prepare libraries for next generation sequencing. Experience in mining bioinformatics data bases and to use bioinformatics tools. Ability/willingness to manage and analyze next-generation sequence data. Ability to make observations, accurately gather and record data as well as interpret and conduct statistical analysis of results.  Ability to draft reports, technical bulletins and scientific posters, and contribute to the production of scientific communications. Ability to work in a team and to communicate effectively in English. | | | | | |

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| [Proposal ID/No de la proposition](#A_ID) : | | Swift Current\_Iwaasa, Alan | | | |
| **PROPOSAL TITLE / TITRE DE LA PROPOSITION** :  **Grazing Systems and Forages Effects on Environmental Grassland Ecosystems** | | | | | |
| Start date (yyyy-mm-dd)/*Date de début* (aaaa-mm-jj) :  2016-08-03 | | | End date (yyyy-mm-dd)/*Date de fin* *(aaaa-mm-jj)* :  2018-08-03 | | |
| Sector(s) relevant to this proposal (underline the selected one or more) / *Secteur(s) pertinent(s) à cette proposition (veuillez sélectionner un ou plusieurs secteur(s)) :* | | | | | |
| Beef and Forage / *Bœuf et cultures fourragères* | Cereals and Pulses / *Céréales et légumineuses* | | Oilseeds / *Oléagineux* | Dairy, Swine and Poultry / *Bœufs laitiers, porcs et volailles* | |
| Horticulture / *Horticulture* | Bioproducts / *Bio-produits* | | Agri-Food */ Agroalimentaire* | Biodiversity and Collections) / *Biodiversité et collections* | |
| Agro-Ecosystem Productivity and Health / *Productivité et santé des agro‑écosystèmes* | | | |  | |
| **A – Identification** | | | | | |
| Type of candidates (check one or more) / *Type de candidats (cochez un ou plusieurs choix)*:   * Graduate students / *Étudiants des cycles supérieurs* : Master’s or equivalent / *Maîtrise ou équivalent* ( ), PhD/*Doctorat* ( X ) * Visiting scientist / *Chercheur invité* ( ) | | | | | |
| Research participant’s expected length of stay at AAFC; specify number of months (minimum - maximum) /  *Durée prévue du séjour du participant à AAC*; *précisez le nombre de mois (minimum-maximum)*: | | | | | 24 |
| Expected number of research participants / *Nombre prévu de participants à la recherche*: | | | | 1 | |
| Research location in Canada (*e.g.*, AAFC Research and Development Centre) / *Lieu de la recherche au Canada (p. ex: le centre de recherche et développement d’AAC) :*  Swift Current Research and Development Centre (SCRDC)  Web site/site Web :  <http://www.agr.gc.ca/eng/science-and-innovation/> ; <http://www.agr.gc.ca/fra/science-et-innovation/> | | | | City/*Ville*, Province :  Swift Current, Saskatchewan | |
| **B – Research Team / *Équipe de recherche*** | | | | | |
| AAFC supervising scientist or research professional /  *Chercheur ou professionnel de la recherche chargé de la supervision à AAC*  Name / *Nom* **: Dr. Alan D. Iwaasa**  Field of expertise / *Domaine d’expertise* : Grazing Management and Ruminant Nutrition | | | | E-mail/*Courriel* :  Alan.iwaasa@agr.gc.ca | |
| Tel./*Téléphone* :  +1-306-770-4473 | |
| Other AAFC collaborators / *Autres collaborateurs d’AAC* :  Dr. Hong Wang, SCRDC co-supervisor | | | | | |
| Canadian non-AAFC collaborators (affiliated organization or industry) / *Collaborateurs canadiens extérieurs à AAC (organisation ou industrie affiliée)* : | | | | | |
| International collaborators (affiliated organization or industry) / *Collaborateurs internationaux (organisation ou industrie affiliée)* : Professors M. Zhao and G.D. Han, College of Ecology and Environmental Science, Inner Mongolia Agricultural University, Hohhot, China | | | | | |
| **C – Project Description / *Description du projet*** | | | | | |
| **Project summary / *Résumé du projet*** :  Participation in several STB research studies: “Farm level grassland BMP impacts on carbon balance and greenhouse gas emissions” (extending potential new STB proposal “Measuring and assessing Canadian rangeland and other agricultural BMPs with enhanced whole-farm model Holos”) and “Development of plant material (grasses, legumes) and mixtures for forage production in Prairie region”. Duties include field sampling, data analysis, modeling and scientific publication. The main outcome will be evaluating the impact of best management practices on GHG emissions, forage and livestock production and improved modeling on grassland ecosystems in Canadian Prairies and in Inner Mongolia, China.  **Aligns with AAFC Science and Technology Priorities, Anticipated impact (including science and commercial values and potentials) / *Correspond aux priorités scientifiques et technologiques d’AAC, retombées prévues (y compris valeur et potentiel commercial et scientifique)***:  This proposal aligns AAFC Science and Technology Branch’s priority of “Generate new knowledge, foster innovation and increase adoption and commercialization of agricultural, agri-food and agri-based products, processes or practices. Implement new AAFC-led science and technology projects under GF2 Agri-Innovation Stream A: Research Accelerating Innovation. The output of the improved grassland ecosystem model will help us to identify sustainable grassland managements for both Canadian prairies and Inner Mongolia grassland to achieve high productivity and protect the environment. | | | | | |
| **D – Describe the necessary qualifications** (academic, knowledge, skills, experience, etc*.*) **and the benefits to the candidate / *Décrivez les qualifications requises*** *(études, connaissances, compétences, expérience, etc.)* ***et les avantages pour le candidat*** | | | | | |
| The candidate should have  (1) Good knowledge and experience in modeling, computer science and mathematics,  (2) Good knowledge and experience in statistical analysis,  (3) Knowledge of environment science and grassland management and  (4) Good English in communication and scientific writing.  The student will lean from the SCRDC research team in grassland management, forage and beef production and environmental measurements. Research presentations, reports and papers will be published. After graduation he/she should become an excellent grazing/forage/range management researcher in grassland ecosystems in the College of Ecology and Environmental Science, Inner Mongolia Agricultural University, Hohhot, China. | | | | | |