

# VINKO CULJAK MATHIEU

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## EDUCATION

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- × 2020 M.Sc. Entomology; McGill University (expected completion: April 2020)  
Thesis: *Properties and temporal dynamics of a plant-pollinator network on Victoria Island, Nunavut.*
- × 2016 Honours BSc with Specialization in Biology summa cum laude; University of Ottawa;  
CGPA: 9.0/10  
Thesis: *Specialist vs. Generalist: Which is the Best Pollinator? The Reproductive Biology and Pollination Ecology of the Nevada Peavine (Lathyrus lanszwertii)*

## PROFESSIONAL OBJECTIVES

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- × Contribute to the recording and curation of Canada's natural heritage and global biodiversity.
- × Expand my knowledge of insect taxonomy and systematics.
- × Further develop my skills in curating natural history collections.
- × Promote science literacy with research, outreach, and science communication programs.

## ZOOLOGY RESEARCH EXPERIENCE

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MSc. Entomology (2017-2020); McGill University; Supervised by Dr. Christopher Buddle

- × Location: Victoria Island, Nunavut, and the Lyman Entomological Museum, Montreal, QC.
- × Goal: Describe the properties of a plant-pollinator network on Victoria Island, Nunavut; determine drivers of diversity and turnover in the network through the flowering season.
- × Work: (A) collected insect pollinators (Diptera, Hymenoptera, and Lepidoptera) when observed visiting flowers; (B) identified plants in the field to species; (C) identified pollinators in the lab using dichotomous keys and specimens from the Lyman Entomological Museum as references.
- × Key competencies: understanding the research cycle, experimental design, logistics planning, ability to motivate others, risk management, working in remote areas.

Research Assistant to Dr. Chris Ernst (Summer, 2016)

- × Location: Hakai Institute, Calvert Islands, BC & Simon Fraser University, Vancouver, BC.
- × Goal: assess the diversity of terrestrial invertebrates on 100 Islands in British Columbia.
- × Work: (A) collecting terrestrial arthropods using pitfall traps and beatsheeting; (B) recording relative abundance of major plant taxa; (C) recording physical structure of plots (substrate, coarse woody debris, canopy cover, shrub height, etc...); (D) sorting & extracting leaf litter samples with Berlese funnels; (E) identifying & sorting insects to family; (F) setup and take down of camp (10-12 days camping at a time); (G) maintaining camp organization and tending to camp chores; (H) driving a 10ft zodiac between camp and islands.

- × Key competencies: leadership, adaptability to a changing work landscape, ability to motivate others, risk management, develop research strategies bound by technical and safety limits.

#### Research Assistant and Lab Manager for Dr. Jessica Forrest (Summer, 2015)

- × Location: Rocky Mountain Biological Laboratory, Colorado, USA.
- × Goal: assess mason bee nest progress and flowering plant species phenology while managing all lab activities.
- × Work: (A) setting up and maintaining trap-nests for solitary bee nesting; (B) recording abundance of flowers for various species; (C) measuring and recording mason bee nest construction progress and parasitism; (D) marking and identifying individual bees; (E) managing and advising undergraduate and co-op students, and research assistants; (F) inventorying, ordering, and distributing field work supplies and equipment.
- × Key competencies: experimental design, providing respectful and constructive suggestions, generating innovative approaches to problem solving, team leadership and management, logistical support, developing safety plans for work in remote areas.

#### BSc. Honours Thesis (2014-2015); University of Ottawa, supervised by Dr. Jessica Forrest

- × Location: Rocky Mountain Biological Laboratory, Colorado, USA, & the University of Ottawa, Ottawa, ON.
- × Goal: describe the pollination ecology and reproductive biology of *L. lanszwertii* Fabaceae.
- × Work: (A) setting up pollinator-exclusion systems on plants; (B) hand pollination to test for self-compatibility and the autogamy; (C) pollinator observations; (D) collection and identification of pollinators.
- × Key competencies: creating a vision and strategy for a research project, problem solving, collaborating with partners, respecting research organizations and funding sources; using dichotomous keys.

#### Research Assistant to Dr Jessica Forrest (Spring, 2014)

- × Location: University of Ottawa, Ottawa, ON.
- × Goal: Quantify the phenology of wildflowers and insect pollinators in Gatineau Park, Quebec, immediately after snow melt.
- × Work: (A) counting wild ephemeral flower buds, flowers, and fruit; (B) catching, identifying, photographing, and releasing bumble bees; (C) sampling bee & wasp populations using pan-traps; (D) recording the construction of solitary native bee nests (primarily *Osmia* spp.); (E) pinning and pointing Hymenoptera specimens obtained from trap-nests throughout the Ottawa Greenbelt; (F) curated the Forrest Lab insect collection (~250 specimens, Hymenoptera).
- × Key competencies: understanding the research cycle, experimental design, generating innovative approaches to problem solving, developing curatorial skills.

#### Research Assistant to Adam Groulx (Summer, 2014)

- × Location: Rocky Mountain Biological Laboratory, Colorado, USA.
- × Goal: Assess the rate of parasitism in mason bees (*Osmia* spp.) with different nesting densities or different resource availabilities.
- × Work: (A) setting up trap-nests for solitary bee nesting; (B) observations of solitary bee and parasitic/kleptoparasitic wasp behavior; (C) recording the construction and parasitism of solitary native bee nests; (D) controlling nesting density by moving nests; (E) controlling floral resource abundance using floating row covers.

- × Key competencies: developing logistics for field work in remote areas, managing complex project objectives, providing respectful and constructive suggestions.

Independent Study Project (Winter, 2014); supervised by Dr. Jessica Forrest

- × Location: Mer Bleue Bog and the University of Ottawa, Ottawa, ON.
- × Goal: Study the foraging habits of solitary bees in the Ottawa area to determine the extent to which bees travel in order to obtain floral resources within habitat mosaics.
- × Work: (A) counted the abundance of different pollen types in pollen provisions and frass of trap-nesting solitary bees (primarily *Osmia* spp.); (B) analyzed data to determine the variation in the pollen content at different nesting sites.
- × Key competencies: developing a research timeline that respects organizational needs and deadlines, approaching questions from various perspectives.

## SKILLS PROFILE

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| Laboratory    | <b>Dissecting microscope (~1,200 h), compound microscope (~200h), laboratory safety &amp; WHMIS training</b> , drying small insect with hexamethyldisilazane (~2,300 specimens), mounting plant specimens on herbarium sheets (~300), dissecting insects and flowers, <b>specimen imaging with StackShot macro rail and Canon DSLR camera (&gt;400 specimens)</b> .                       |
| Field         | Experimental design, netting & marking bees, pollinator observations and identification, collecting insects ( <b>beat sheeting, pitfall traps, aerial nets, sweep nets, Berlese funnels, Malaise traps, intercept traps</b> ), collecting and pressing plant specimens, developing and managing safety protocols, working in remote regions, <b>setting up logistics for field work</b> . |
| Curatorial    | <b>Pinning and pointing insect specimens (~4,500 specimens)</b> , sorting specimens to order and family (>60,000 specimens), using <b>dichotomous keys</b> to identify insects to genus and species (~3,500), packaging and shipping of specimens, <b>cataloguing</b> , pest monitoring and management.   |
| Data Handling | Data structure analysis, <b>database development, data management and tracking</b> , data backup, datasheet creation.   |
| Statistics    | Simple descriptive statistics in MS Excel, <b>complex model selection and analysis in the R statistical software package</b> .  |
| GIS           | <b>ArcGIS 10</b> , understanding of spatial data, data entry/conversion, metadata creation/editing, GIS analysis, cartography, Global Positioning System.   |
| Management    | Leads groups, <b>teaches/trains/instructs, delegates responsibility</b> , manages conflict, enforces policies, takes charge.  |
| Computer      | Expert user in content creation software (MS Word, MS Excel, Adobe Photoshop, Adobe Illustrator), software problem solving and repair, MATLAB, <b>R statistical software package</b> .  |

## TEACHING EXPERIENCE

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- 2018, 2019 Instructor for ten of the Quebec Center for Biodiversity Science R workshops on applied biostatistics. Montreal, QC.  
Topics: data management and manipulation, plotting, linear models and programming in R.
- 2017, 2018, 2019 Teaching Assistant in Insect Biology. McGill University. Montreal, Canada.  
Prepared laboratory materials (pinned specimens); assisted students in identifying insects to order and family; helped students navigate insect anatomy; created laboratory examinations; curated the insect teaching collection (~1,200 specimens).
- 2019, Fall Teaching Assistant in Flowering Plant Diversity. McGill University. QC.  
Prepared laboratory materials (fresh and frozen flowers, herbarium specimens); assisted students in identifying plants to the species level using dichotomous keys; developed teaching strategies for use in botany classes; curated the plant teaching collection (~950 specimens).
- 2019, Fall Instructor for workshop on science communication. Montreal, QC.  
Taught the fundamentals of effective communication using group activities, peer evaluation, and active learning strategies. Topics: knowing your audience, eliminating jargon, storytelling in science, media interview skills.
- 2018, Winter Guest instructor for five seventh-grade classes. Montreal, QC.  
Topics: entomology, botany, ecology, biogeography, and evolution.  
Used active learning strategies: think-pair-share and group labs.
- 2015, Winter Teaching Assistant in Entomology, University of Ottawa. Ottawa, ON.  
Provided in-lab support teaching the use dichotomous keys and stereomicroscopes; helped students identify common local insects to order and family; helped students navigate the anatomy of panarthropod groups (Chelicerata, Crustacea, Myriapoda, etc...)
- 2015, Fall Teaching Assistant in Applied Biostats. University of Ottawa. Ottawa, ON.  
Taught applied biostatistics by promoting innovative approaches to problem solving, focusing on learning outcomes and providing constructive feedback adapted to individual students' needs.
- 2015, Summer Instructor for a five-day workshop in biostatistics. Rocky Mountain Biological Laboratory. Colorado, USA.  
Created and taught a five-day workshop on the basics of biostatistics and coding in R. Taught basic statistical methods, coding principals and skills to deconstruct complex problems. Used an active learning process to engage students with the material.
- 2006-2015 Private tutor for STEM material. Ottawa, ON.  
Taught biology, chemistry, ecology, mathematics, computer science, applied biostatistics, geography and basic science to students from grade 4 through third-year university. Used individualized learning plans incorporating goal setting, constructive feedback, flexibility and respect with regards to individual needs.

- 2005-2008 Volunteer teaching assistant, grades 3, 4 & 6. Torbolton Elementary School. Ottawa, ON.  
Assisted students with their homework; developed game-based active learning activities; graded homework and provided constructive feedback; prepared teaching materials.
- 2005-2006 Volunteer tutor in the Junior Undiscovered Math Prodigies program; Torbolton Elementary School. Ottawa, ON, Canada.  
Taught mathematics to students in grades 4 & 5, one-on-one, using individualized learn plans, active learning strategies, and games.

## SCIENCE OUTREACH & COMMUNICATION

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- 2019-present Letters to a Pre-Scientist volunteer writer: Pen-pal program wherein STEM researchers and professionals demystify STEM careers and empower students to see themselves as future scientists.
- 2018-present Scientific advisor to the McGill Apicultural Association. Montreal, QC.
- 2017-present Tour guide at the Lyman Entomological Museum. Montreal, QC.
- 2017-present Skype-a-Scientist participant: 19 video conference calls with classes across the USA wherein I discussed careers in science and entomology.
- 2020 Invited Speaker – Brome Lake Garden Club Lecture Series. Knowlton, QC.  
Title: *Keeping the bees: Taking the sting out of dwindling bee populations*
- 2020 Invited Speaker – Garden Club of Montreal Lecture Series. Montreal, QC.  
Title: *The Good, The Bad, and The Bugly: Making sense of insect friends and enemies.*
- 2019 Invited Speaker – Brome Lake Garden Club Lecture Series. Knowlton, AC.  
Title: *The Good, The Bad, and The Bugly: Making sense of insect friends and enemies.*
- 2018 Botany & Entomology tour guide. Cambridge Bay, NU.
- 2017 Interviewed on Qulliq (CBC Radio – North) about plants and pollinators in the Canadian Arctic. Iqaluit, NU.
- 2017 Interviewed for The McGill Tribune – *Where did these butterflies come from and where are they off to?* Montreal, QC.
- 2017 Interview for McGill University News - *Experts: Orange Butterflies in Quebec.* Montreal, QC.
- 2016 Contributor to [www.centralcoastbiodiversity.org](http://www.centralcoastbiodiversity.org)
- 2013-2016 Led six entomology workshops at two different middle schools. Ottawa, ON.
- 2014 Volunteer Leader for the Macoun Field Club (children 8-14). Ottawa, ON.

## OTHER ACTIVITIES

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Statistician at the Treasury Board of Canada. Developed statistical models for evaluating internal services costs across all departments of the Canadian federal government. 2016.

GIS Technician at the federal Department of Public Safety and Emergency Preparedness in the Government Operations Center. Created maps off ongoing emergencies of national interest. 2016

Owner and operator of Culjak Productions, a web development company serving real estate agents, property managers and private communities. Directed and coordinated activities of businesses, reviewed financial statements, and sales and activity reports. Designed, built, maintained and updated web sites; developed databases that support web applications; managed a web hosting server. 2008-2018.

## GRANTS, SCHOLARSHIPS & AWARDS

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| 2019 | E Melville DuPorte Award, McGill University. \$500.                               |
| 2018 | Margaret DuPorte Fellowship, McGill University. \$8,000.                          |
| 2018 | E Melville DuPorte Award, McGill University. \$500.                               |
| 2018 | Northern Scientific Training Program, McGill University. \$2,820.                 |
| 2017 | Margaret DuPorte Fellowship, McGill University. \$8,000.                          |
| 2017 | Graduate Excellence Award, McGill University. \$5,000.                            |
| 2017 | NSERC Canada Graduate Scholarships, Concordia University. \$17,500.<br>(declined) |
| 2016 | NSERC Undergraduate Student Research Awards, Simon Fraser University. \$4,500.    |
| 2016 | Carson Award for Excellence in Undergraduate Biology. \$2,500.                    |
| 2014 | Undergraduate Research Opportunity Program, University of Ottawa. \$1,000.        |
| 2012 | Admission Scholarship, University of Ottawa. \$16,000.                            |

## CONFERENCES

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- 2020 SciComm Day – McGill University. Montreal, QC.
- 2019 Arctic Net Annual Scientific Meeting. Halifax, NS.  
Talk: *Species and interaction diversity in plant-pollinator networks on Victoria Island, Nunavut*  
Talk: *Communicating science through storytelling*
- 2019 Joint Meeting - Acadian Entomological Society, Entomological Society of Canada, and Canadian Society for Ecology and Evolution. Fredericton, NB.  
Poster: *Temporal dynamics of plant-pollinator networks in the Canadian Arctic Archipelago*
- 2019 ComSciCon Canada. Hamilton, ON.
- 2018 McGill North Day. Montreal, QC.
- 2017 Entomological Society of Ontario Annual General Meeting. Guelph, ON.  
Poster: *Specialist vs. generalist: which is the best pollinator? The reproductive biology and pollination ecology of the Nevada peavine (Lathyrus lanszwertii)*

## CERTIFICATION

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- × WHMIS for Laboratory Workers Certificate
- × Wet Lab Safety Training Certificate
- × ESRI Learning ArcGIS 10 Desktop Certificate
- × Pleasure Craft Operator Card
- × Standard First Aid & CPR Level C
- × Secret level security clearance at the Government of Canada

## LANGUAGES

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- × English Advanced (speaking, reading, writing)
- × Spanish Advanced (speaking, reading), intermediate (writing)
- × French Intermediate (speaking, reading, writing)
- × Italian Beginner