

# Valentin Joly

## Molecular biologist • Bioinformatician

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As a Ph.D. student at the Matton lab, I aim to decipher the molecular mechanisms governing prezygotic breeding barriers in wild potato species. I am especially interested in pollen tube guidance, with a dual approach involving bioinformatics (next-gen sequencing) and molecular biology (protein expression and functional assays). *More info at [vjoly.net](http://vjoly.net).*

## Education

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- Ph.D. | Biological Sciences, 2013–present** (thesis to be submitted in June 2019)  
**M.Sc. | Biological Sciences, 2012** (accelerated transition to Ph.D. in 2013)  
University of Montreal, *Montreal, QC, Canada*  
**Thesis:** Molecular communication between male and female gametophytes and reproductive barriers in wild potatoes (*Solanum* sect. *Petota*).  
**B.Sc. | Biology, international program, 2011**  
Pierre & Marie Curie University (UPMC), *Paris, France*: years 1 and 2  
University of Montreal (UdeM), *Montreal, QC, Canada*: year 3

## Research experience

🔬 Molecular biology </> Bioinformatics

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- Canada | Ph.D. Project, 2013–present**  
*Prof. Daniel P. Matton, IRBV, University of Montreal*  
🔬 DNA/RNA techniques. Cloning. Protein expression and purification.  
🔬 Plant cell culture. Pollen tube guidance assays. Microfluidics.  
🔬 Microscopy: epifluorescence, confocal, SEM, TEM.  
</> Python and R programming. Development of the sequence search tool KAPPA.  
</> Transcriptomics: RNA-seq assemblies. Microarray analysis. DGE. Annotation.  
</> Proteomics: LC-MS data analysis. Secretomics. Label-free protein quantification.
- Sweden | International collaboration, 2016–2018**  
*Dr. Johan Edqvist, Linköping University*  
🔬 Protein expression and purification in *Pichia pastoris*.  
</> Development of a nsLTP prediction tool and a plant nsLTP database.
- Japan | JSPS Summer Program, June–Aug. 2016**  
*Prof. Tetsuya Higashiyama, ITbM, Nagoya University*  
🔬 Development of microfluidic devices for pollen tube guidance assays.  
🔬 Introduction to 2-photon confocal microscopy.

<b>USA</b>	<b>International research internship, Apr.–May 2014</b> <i>Prof. Willie J. Swanson, University of Washington</i> </> Variant calling (GATK). </> Molecular evolution and positive selection analysis (codeml).
<b>Argentina</b>	<b>Botanical transect, Apr.–May 2012</b> <i>Partnership with Dr. Franco E. Chiarini, Universidad Nacional de Córdoba</i> 🔬 Collection of potato individuals in the Andes cordillera.
<b>Canada</b>	<b>Research internship, Jan.–Aug. 2011</b> <i>Prof. Daniel P. Matton, University of Montreal</i> 🔬 Molecular cloning. Biolistics. Epifluorescence and confocal microscopy.
<b>France</b>	<b>Research internship, June–July 2010</b> <i>Prof. Christophe Bailly, CNRS/Pierre &amp; Marie Curie University, Paris</i> 🔬 Seed dormancy and germination biology.  <b>Short-term introductory internship, Jan. 2009</b> <i>Prof. Chris Bowler, CNRS/École Normale Supérieure, Paris</i> 🔬 Protein electrophoresis. Immunoprecipitation. Western Blotting.

## Extra training

<b>Bioinformatics</b>	<b>Online Bioinformatics Specialization, 2016–2018</b> <i>University of California San Diego, on Coursera</i> <ol style="list-style-type: none"> <li>1. <i>Finding Hidden Messages in DNA.</i> Certif. <a href="#">SPRUS2D6NH</a></li> <li>2. <i>Genome Sequencing.</i> Certif. <a href="#">73HUUXBY64</a></li> <li>3. <i>Comparing Genes, Proteins, and Genomes.</i> Certif. <a href="#">HY7JCN6UV2</a></li> <li>4. <i>Molecular Evolution.</i> Certif. <a href="#">VYKM2WT4792A</a></li> <li>5. <i>Genomic Data Science and Clustering.</i> Certif. <a href="#">M6ZPV8VCEH</a></li> <li>6. <i>Finding Mutations in DNA and Proteins.</i> Certif. <a href="#">EVDAXLXV9L</a></li> <li>7. <i>Bioinformatics Capstone: Big Data in Biology.</i> Certif. <a href="#">56XJX7TMHYVM</a></li> </ol> <b>Global Specialization Certificate.</b> Certif. <a href="#">H528Q2K9KYB6</a>
<b>Python/R</b>	<b>Bioinformatics Online Courses, 2016</b> <i>Johns Hopkins University, on Coursera</i> <ul style="list-style-type: none"> <li>• <i>Python for Genomic Data Science.</i> Certif. <a href="#">XHKWDB4XD7</a></li> <li>• <i>Introduction to Genomic Technologies.</i> Certif. <a href="#">U88T89XKR2</a></li> <li>• <i>R Programming.</i> Certif. <a href="#">X8NKEQAUU4</a></li> </ul>
<b>Sequence annotation</b>	<b>International seminar in automated functional protein annotation, 2012</b> <i>BLAST2GO, University of California Davis</i>

- 2019 | Mazin BD, **Joly V** and Matton DP. (2019). The ScFRK2 mitogen-activated protein kinase kinase kinase (MAP3K) is involved in early embryo sac development in *Solanum chacoense*. *Plant Signaling & Behavior*. DOI: [10.1080/15592324.2019.1620059](https://doi.org/10.1080/15592324.2019.1620059)
- 2018 | Salminen TA, Eklund DM, **Joly V**, Blomqvist K, Matton DP and Edqvist J. (2018). Deciphering the evolution and development of the cuticle by studying lipid transfer proteins in mosses and liverworts. *Plants*, 7(1), 6. DOI: [10.3390/plants7010006](https://doi.org/10.3390/plants7010006)
- 2015 | **Joly V** and Matton DP. (2015). KAPPA, a simple algorithm for the discovery and clustering of proteins defined by a key amino acid pattern. *Bioinformatics*, 31(11), 1716–1723. DOI: [10.1093/bioinformatics/btv047](https://doi.org/10.1093/bioinformatics/btv047)
- Liu Y\*, **Joly V\***, Dorion S, Rivoal J and Matton DP. (2015). The plant ovule secretome: a different view toward pollen-pistil interactions. *Journal of Proteome Research*, 14(11):4763–75. DOI: [10.1021/acs.jproteome.5b00618](https://doi.org/10.1021/acs.jproteome.5b00618)
- Lafleur É\*, Kapfer C\*, **Joly V**, Liu Y, Tebbji F, Daigle C, Gray-Mitsumune M, Cappadocia M, Nantel A and Matton DP. (2015). The ScFRK1 MAPK kinase kinase (MAPKKK) from *Solanum chacoense* is involved in embryo sac and pollen development. *Journal of Experimental Botany*, 66(7), 1833–1843. DOI: [10.1093/jxb/eru524](https://doi.org/10.1093/jxb/eru524)
- submitted | **Joly V\***, Tebbji F\* and Matton DP. Pollination type recognition from a distance by the ovary is revealed by a global transcriptomic analysis. Submitted on May 1st 2019.
- upcoming | **Joly V\***, Liu Y\* and Matton DP. Comparative RNA-sequencing reveals female gametophyte-sac specific transcripts in the *frk1* embryo sac-less mutant from *Solanum chacoense*. **To be submitted by Aug. 2019.**
- Joly V**, Liu Y and Matton DP. A transcriptomic time-course reveals developmentally regulated transcripts during ovule genesis and maturation in *Solanum chacoense*. **To be submitted by Aug. 2019.**

## Computer code

- 2015 | **Joly V** and Matton DP. Key Aminoacid Pattern-based Protein Analyzer (KAPPA).
- Version 1.1 published under GPL license on [GitHub](https://github.com).
  - Version 1.0 published under GPL license on [SourceForge](https://sourceforge.net).

- 2017 ★ **Joly V**, Viallet C, Liu Y, Zaro A, Ceriotti F and Matton DP. *Deciphering species-specific pollen tube guidance in Solanum*. CSPB Eastern Regional Meeting, Montreal, QC, Canada; Nov. 24–25, 2017.  
**Joly V**, Viallet C, Liu Y and Matton DP. *Reproductive cysteine-rich proteins: key players in Solanum speciation?* Plant Biology 2017, Honolulu, HI, USA; June 23–28, 2017.
- 2015 ★ **Joly V** and Matton DP. *Plants' secret words of love: rapid evolution of pollen–pistil recognition proteins drives reproductive isolation of wild potatoes*. Botany 2015, Edmonton, AB, Canada; July 26–29, 2015.
- 2013 ★ **Joly V** and Matton DP. *Comment éviter les liaisons dangereuses : secrets d'alcôve des pommes de terre*. Journées du Centre SÈVE, Wendake, QC, Canada; Nov. 7–8, 2013.  
★ **Joly V**, Liu Y and Matton DP. *Divergence des protéines reproductives et maintien des barrières de spéciation chez les pommes de terre sauvages*. 23<sup>e</sup> Symposium des Sciences biologiques, University of Montreal, Montreal, QC, Canada; Mar. 21, 2013.

## Oral presentations as an invited speaker

- 2018 **Joly V** and Matton DP. *Potato sexomics: deciphering species-specific pollen tube guidance in wild potatoes with high-throughput sequencing technologies*. Dept of Molecular, Cellular and Developmental Biology, Yale University, New Haven, CT, USA; Oct. 22, 2018.
- 2016 **Joly V** and Matton DP. *Pollen tube guidance and reproductive isolation in wild potatoes*. Dept. of Functional Genomics, Kanazawa University, Japan; Aug. 18, 2016.  
**Joly V** and Matton DP. *Species-specific pollen tube guidance in wild potatoes*. Plant Molecular Biology Laboratory, Kyoto University, Japan; Aug. 12, 2016.  
**Joly V** and Matton DP. *Deciphering potatoes' words of love*. Institute for Transformative bio-Molecules (ITbM), Nagoya University, Japan; July 13, 2016.
- 2015 **Joly V** and Matton DP. *Sex among wild potatoes: ladies wear the pants*. Centre for Structural and Functional Genomics, Concordia University, Montreal, QC, Canada; July 16, 2015.
- 2014 **Joly V** and Matton DP. *Cell-cell communication between gametophytes and reproductive isolation in wild potatoes*. Dept. of Genome Sciences, University of Washington, Seattle, WA, USA; Apr. 24, 2014.
- 2013 **Joly V** and Matton DP. *Species-specificity of pollen-pistil interactions in wild potatoes*. Institute of Genetics, Chinese Academy of Science, Beijing, China; Oct. 24, 2013.

- 2018 | **Joly V** and Matton DP. *Long-distance relationships: how the ovary perceives different pollination types at a distance*. Plant Biology 2018, Montreal, QC, Canada; July 14–18, 2018.
- 2016 | ★ **Joly V**, Liu Y, Dorion S, Rivoal J and Matton DP. *Ovule secretomics reveal the importance of post-transcriptional regulation of reproductive proteins*. Plant Reproduction 2016, Tucson, AZ, USA; March 18–23, 2016.  
 ★ **Joly V** and Matton DP. *KAPPA: exploring -omics data to detect and cluster cysteine-rich proteins*. [same conference as above]
- 2015 | ★ **Joly V** and Matton DP. *KAPPA: meeting the challenge of proteome-wide detection and clustering of cysteine-rich proteins*. High Performance Computing Symposium HPCS 2015, Montreal, QC, Canada; June 17–19, 2015.
- 2013 | **Joly V**, Liu Y and Matton DP. *Interspecific divergence of reproductive proteins: the keystone of species-specific fertilization in wild potatoes?* 10th Solanaceae Conference (SOL 2013), Beijing, China; Oct. 13–17, 2013.  
**Joly V** and Matton DP. *Speciation genes in pollen-pistil interactions*. 9th Canadian Plant Genomics Workshop, Halifax, NS, Canada; Aug. 12–15, 2013.

## Other presentations

\*Presenter

- 2019 | Mazin BD\*, Daigle C, **Joly V** and Matton DP. *The ScFRK2 and ScFRK3 MAP Kinase Kinase Kinase are involved in ovule development in Solanum chacoense*. Plant Biology 2019, San Jose, CA, Canada; Aug. 3–7, 2019.
- 2018 | **Joly V** and Matton DP\*. *Pre-zygotic barriers in inter-specific crosses: a leading role for small cysteine-rich protein attractant in wild potatoes species ?* Plant Biology 2018, Montreal, QC, Canada; July 14–18, 2018.
- 2017 | **Joly V** and Matton DP\*. *Pollination type recognition from a distance by the ovary is revealed by a global transcriptomic analysis*. 5th International Symposium on Plant Signaling and Behavior, Matsue, Japan; June 26–July 1, 2017.
- 2013 | Liu Y\*, Bai F, **Joly V** and Matton DP. *Identification of female gametophyte-specific CRPs and isolation of pollen tube guidance attractant(s) in solanaceous species*. Journées du Centre SÈVE, Wendake, QC, Canada; Nov. 7–8, 2013.
- Tebbj F, **Joly V** and Matton DP\*. *Pollination type recognition from a distance by the ovary is revealed by a global transcriptomic analysis*. 10th Solanaceae Conference (SOL 2013), Beijing, China; Oct. 13–17, 2013.
- Liu Y\*, **Joly V** and Matton DP. *Isolation and characterization of the pollen tube attractant from Solanum chacoense*. [same conference as above].
- 2011 | Daigle C\*, **Joly V** and Matton DP. *Discovering new MAPK signalling cascades involved in plant reproduction using co-expression analyses and deep transcriptomic sequencing of ovule and pollen tubes*. 7th Canadian Plant Genomics Workshop, Niagara Falls, ON, Canada; Aug. 22–25, 2011.

## Popular science

- 2016 | **Joly V**. *Le sexe des plantes avec Valentin Joly*. Radio interview for the science popularization program [Les années lumière](#) on Radio-Canada. Broadcasted on Apr. 24, 2016.
- 2014 | **Joly V**. *Les mots d'amour des plantes à fleurs*. Popularization article written for *L'ARN messager*, online biology students' journal at the University of Montreal. Published on Dec. 19, 2014.

## Teaching

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<b>Plant physiology</b>	<b>Chief teaching assistant, 2013–2018</b> <b>Teaching assistant, 2011–2012</b> <i>Plant physiology labs, Prof. Jean Rivoal, University of Montreal</i> <ul style="list-style-type: none"><li>• Teaching load: 140 hours per session, about 70 students</li><li>• Weekly sessions including a lecture (0:45) and a practical session (2:30)</li><li>• Supervision of 1–2 teaching assistants</li></ul>
<b>Molecular biology</b>	<b>Teaching assistant, 2014–2016</b> <i>Molecular biology labs, Prof. D. P. Matton, University of Montreal</i> <ul style="list-style-type: none"><li>• Teaching load: 110 hours per session, 10-20 students</li></ul>

## Supervision of interns

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<b>Grad students</b>	<i>These students from Latin America were hosted in my advisor's laboratory as part of the Emerging Leaders in the Americas Program (ELAP) organized by the Government of Canada. I was their supervisor for 5- to 6-month internships related to my Ph.D. project.</i> <ul style="list-style-type: none"><li>• <b>Kelly Rodrigues</b>      2018-19    Ph.D.    U.F.R.G.S. (Brazil)</li><li>• <b>Federico Ceriotti</b>    2017-18    M.Sc.    Natl. Univ. of Cuyo (Argentina)</li><li>• <b>Carlos Bravo</b>        2016-17    Ph.D.    Natl. Univ. of Mexico (Mexico)</li><li>• <b>Laura González</b>      2016        Ph.D.    Natl. Univ. of Córdoba (Argentina)</li><li>• <b>Mariana Quiroga</b>    2015        Ph.D.    Natl. Univ. of Córdoba (Argentina)</li></ul>		
<b>Undergrads</b>	<i>I supervised these students for 4- to 6-month research internships required in their academic program.</i> <ul style="list-style-type: none"><li>• <b>Maude Dorval</b>        2018        B.Sc.    Univ. of Montreal (Canada)</li><li>                                 2017        DEC      Collège Ahuntsic (Canada)</li><li>• <b>Anna Zaro Sánchez</b>   2017        B.Sc.    Univ. of Barcelona (Spain)</li><li>• <b>Francis Banville</b>      2017        B.Sc.    Univ. of Montreal (Canada)</li><li>• <b>Andréa Davrinche</b>    2014        B.Sc.    P. &amp; M. Curie Univ. (France)</li><li>• <b>Ella Gangbe</b>          2013        B.Sc.    Univ. of Montreal (Canada)</li><li>• <b>Tissicca Hour</b>        2012        B.Sc.    Univ. of Montreal (Canada)</li></ul>		

- 2019–21 | ★ **Postdoctoral Scholarship (B3X)**  
*Fonds de Recherche du Québec – Nature et Technologies* (FRQNT)  
 Government of Québec, Canada, CAD 110,000
- 2018 | **Jacques-Rousseau Travel Scholarship**  
 Plant Biology Research Institute, University of Montreal, CAD 800
- 2017 | ★ **Hydro-Québec Excellence Scholarship**  
 Hydro-Québec (national electricity company), CAD 25,000  
**Scholarship for Finishing Ph.D. Students (BEFD)**  
 Faculty of Graduate and Postdoctoral Studies, University of Montreal, CAD 8,400  
**Jacques-Rousseau Travel Scholarship**  
 Plant Biology Research Institute, University of Montreal, CAD 1,500  
**Travel Scholarship** (*Bourse d'appui à la diffusion des résultats de recherche*)  
 Faculty of Graduate and Postdoctoral Studies, University of Montreal, CAD 500  
**Honorable mention** for a student oral presentation  
 CSPB Eastern Regional Meeting
- 2016 | ★ **Hydro-Québec Excellence Scholarship**  
 Hydro-Québec (national electricity company), CAD 25,000  
 ★ **MITACS Globalink Award / JSPS Summer Program**  
 MITACS/Japanese Society for the Promotion of Science, JPY 550,000  
 ★ **Ph.D. Scholarship from the Government of Québec**  
*Fonds de Recherche du Québec – Nature et Technologies* (FRQNT)  
 Government of Québec, Canada, CAD 13,333  
**Best Graduate Student Poster Award**  
 Frontiers in Plant Reprod. Biology, *Plant Reproduction 2016* Conference, USD 300  
**Jacques-Rousseau Travel Scholarship**  
 Plant Biology Research Institute, University of Montreal, CAD 1,500  
**PARSECS Travel Scholarship**  
 FAÉCUM, University of Montreal, CAD 400
- 2015 | ★ **Catherine-Frédette Excellence Scholarship in Biological Sciences and Neurology**  
 Faculty of Graduate and Postdoctoral Studies, University of Montreal, CAD 5,000  
**FBSB Ph.D. Scholarship from the Dept. of Biological Sciences**  
 University of Montreal, CAD 1,500  
**President's Award for the Best Student Oral Presentation**  
 Canadian Society of Plant Biologists (CSPB), Botany 2015 Conference, CAD 500  
**Best Student Poster Award**  
 Compute Canada, High Performance Computing Symposium HPCS 2015, CAD 500  
**G.-H. Duff Travel Scholarship**  
 Canadian Society of Plant Biologists (CSPB), CAD 340



- 2015 | **Jacques-Rousseau Travel Scholarship**  
Plant Biology Research Institute, University of Montreal, CAD 775  
★ **Excellence Scholarship from the Faculty of Graduate and Postdoctoral Studies**  
University of Montreal, CAD 3,000
- 2014 | **Pehr-Kalm Scholarship**  
Montreal Botanical Garden, CAD 2,000  
★ **Travel Scholarship for International Interns**  
Government of Quebec (FRQNT) – Centre SÈVE, CAD 3,815  
**Jacques-Rousseau Travel Scholarship**  
Plant Biology Research Institute, University of Montreal, CAD 1,769
- 2013 | ★ **Marie-Victorin Excellence Scholarship**  
Plant Biology Research Institute, University of Montreal, CAD 3,000  
**Best Oral Presentation Award**  
Journées du Centre SÈVE, CAD 300  
**Jacques-Rousseau Travel Scholarship**  
Plant Biology Research Institute, University of Montreal, CAD 850  
**Best Oral Presentation Award**  
Symposium of Biological Sciences, University of Montreal, CAD 100
- 2012 | **FBSB M.Sc. Scholarship from the Dept. of Biological Sciences**  
University of Montreal, CAD 1,200  
★ **Scholarship for Accelerated M.Sc.-to-Ph.D. Transition**  
Faculty of Graduate and Postdoctoral Studies, University of Montreal, CAD 14,000
- 2011 | **Travel Scholarship for Student Exchange in Canada**  
French Ministry of Research (CROUS), EUR 1,600  
**PIL Excellence Scholarship for Student Exchange in Canada**  
Pierre & Marie Curie University (Paris VI), EUR 1,500  
**AMIÉ Travel Scholarship for Student Exchange in Canada**  
French Regional Authority (*Conseil régional*), EUR 2,800  
**Campus'Trotter Scholarship for Student Exchange in Canada**  
French Local Authority (*Conseil général*), EUR 700
- 2010 | **Best B.Sc. Student in the Dept. of Biology**  
Pierre & Marie Curie University (UPMC), after the June 2010 final exams
- 2008 | ★ **Excellence Scholarship for Undergraduate Studies**  
French Ministry of Research (CROUS), EUR 5,400

## Service

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<b>Societies</b>	<b>American Society of Plant Biologists (ASPB), 2016–present</b> <b>Canadian Society of Plant Biologists (CSPB), 2014–present</b> <b>International Association of Sexual Plant Reproduction Research (IASPRR), 2015–present</b> <b>Quebec Biological Association (ABQ), 2013–2018</b> <b>French Botanical Society (SBF), 2010–2011</b>
<b>Students' associations</b>	<b>Naturalist Students' Association <i>Timarcha</i>, 2010–2011</b> Pierre & Marie Curie University (UPMC), Paris, France <b>Environmental Committee <i>Éco-école</i>, 2006–2008</b> Lycée Saint-Sauveur ( $\approx$ high school), Redon, France
<b>Volunteering</b>	<b>Volunteer French teacher for newcomers to Canada, 2015–2016</b> Community Center <i>The House of Friendship</i> , Montreal, QC, Canada • 3-hour lessons every week with 10-20 students <b>Contributor to various online projects:</b> • Writer and translator for <i>Wikipedia</i> (biology-related articles), 2008–present • Volunteer cartographer for <i>OpenStreetMap</i> , 2015–present • Herbarium digitalization for the Paris National Museum of Natural History (Project “ <i>Les Herbonautes</i> ”), 2015

## Other skills

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<b>Languages</b>	<b>French</b> , mother tongue <b>English</b> , fluent <b>Spanish</b> , fluent <b>Italian</b> , intermediate <b>Esperanto and Japanese</b> , beginner
<b>Computing</b>	<b>Programming:</b> Python and R. Bases in C and Perl. <b>Web:</b> HTML/CSS, Jekyll. <b>Operating systems:</b> Linux ( <i>Ubuntu</i> , <i>Fedora</i> , <i>CentOS</i> ), Mac OS X, Windows. <b>Bioinformatics:</b> assemblers ( <i>Trinity</i> , <i>CLC</i> , etc.); read aligners ( <i>Bowtie</i> , <i>TopHat</i> , etc.); sequence search and alignment tools ( <i>BLAST</i> , etc.); annotators ( <i>BLAST2GO</i> , <i>PFAM-scan</i> , <i>SignalP</i> , etc.) <b>Office software:</b> $\LaTeX$ , <i>LibreOffice/OpenOffice</i> , <i>Microsoft Office</i> <b>Image processing:</b> <i>GIMP</i> , <i>Inkscape</i> , <i>ImageJ</i> , <i>Adobe Photoshop</i> , <i>Cytoscape</i> ; <i>AxioVision</i> (Zeiss microscope steering program)