

# Valentin Joly, Ph.D.

## Postdoctoral Fellow in Molecular biology & Bioinformatics

📍 Yale University, USA    ✉ [valentin.joly@yale.edu](mailto:valentin.joly@yale.edu)    🌐 <http://vjoly.net>    👤 [valentinjoly](#)  
🇨🇦 Canadian & French    📞 +1 (475) 209-6054    📧 [valentin.joly](#)    🔄 [valentinjoly](#)

During my graduate studies at the [Matton Lab](#) of the University of Montreal, I worked on ovular gene expression and pollen–pistil communication in wild potatoes, with an approach combining molecular biology and bioinformatics. In 2019, I joined the [Jacob Lab](#) at Yale University as a postdoc fellow, with a new CRISPR/Cas9-based project aiming to reveal hidden functions of *Arabidopsis* heterochromatin. *More info at [vjoly.net](http://vjoly.net).*

## Education

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**Ph.D. | Biological Sciences, 2019** (“mention Exceptionnel”, ≈ *summa cum laude*)  
**M.Sc. | Biological Sciences, 2012** (accelerated transition to Ph.D. in 2013)  
University of Montreal, *Montreal, QC, Canada*  
**Advisor:** Prof. Daniel P. Matton, Plant Biology Research Institute (IRBV)  
**Thesis:** Bioinformatic exploration of pollen–pistil interactions in *Solanum chacoense*.

**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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**USA | Postdoctoral Fellow, 2019–present**  
*Prof. Yannick Jacob, MCDB, Yale University*  
🔬 CRISPR/Cas9 genome editing.  
</> High-throughput transcriptomics & methylomics.

**Canada | Ph.D. Project, 2013–2019**  
*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.

<b>Japan</b>	<p><b>JSPS Summer Program, June–Aug. 2016</b>  <i>Prof. Tetsuya Higashiyama, ITbM, Nagoya University</i></p> <ul style="list-style-type: none"> <li>🔬 Development of microfluidic devices for pollen tube guidance assays.</li> <li>🔬 Introduction to 2-photon confocal microscopy.</li> </ul>
<b>USA</b>	<p><b>International research internship, Apr.–May 2014</b>  <i>Prof. Willie J. Swanson, University of Washington</i></p> <ul style="list-style-type: none"> <li>&lt;/&gt; Variant calling (GATK).</li> <li>&lt;/&gt; Molecular evolution and positive selection analysis (codeml).</li> </ul>
<b>Argentina</b>	<p><b>Botanical transect, Apr.–May 2012</b>  <i>Partnership with Dr. Franco E. Chiarini, Universidad Nacional de Córdoba</i></p> <ul style="list-style-type: none"> <li>🔬 Collection of potato individuals in the Andes cordillera.</li> </ul>
<b>Canada</b>	<p><b>Research internship, Jan.–Aug. 2011</b>  <i>Prof. Daniel P. Matton, University of Montreal</i></p> <ul style="list-style-type: none"> <li>🔬 Molecular cloning. Biolistics. Epifluorescence and confocal microscopy.</li> </ul>
<b>France</b>	<p><b>Research internship, June–July 2010</b>  <i>Prof. Christophe Bailly, CNRS/Pierre &amp; Marie Curie University, Paris</i></p> <ul style="list-style-type: none"> <li>🔬 Seed dormancy and germination biology.</li> </ul> <p><b>Short-term introductory internship, Jan. 2009</b>  <i>Prof. Chris Bowler, CNRS/École Normale Supérieure, Paris</i></p> <ul style="list-style-type: none"> <li>🔬 Protein electrophoresis. Immunoprecipitation. Western Blotting.</li> </ul>

**Extra training**

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

- 2019 | **Joly V\***, Tebbji F\*, Nantel A and Matton DP. Pollination type recognition from a distance by the ovary is revealed by a global transcriptomic analysis. *Plants*, 2019, 8(6), 185. DOI: [10.3390/plants8060185](https://doi.org/10.3390/plants8060185)
- 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*, 14(8), 1620059. 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)
- upcoming | **Joly V\***, Liu Y\* and Matton DP. Transcriptomic profiling of *Solanum chacoense* mature, immature, and embryo sac-less ovules. **To be submitted in September 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).

## Oral presentations in scientific conferences

★ Award

- 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.  
Tebbji 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 messenger*, online biology students' journal at the University of Montreal. Published on Dec. 19, 2014.

## Teaching

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### Plant physiology

**Chief teaching assistant, 2013–2018**

**Teaching assistant, 2011–2012**

*Plant physiology labs, Prof. Jean Rivoal, University of Montreal*

- Teaching load: 140 hours per session, about 70 students
- Weekly sessions including a lecture (0:45) and a practical session (2:30)
- Supervision of 1–2 teaching assistants

### Molecular biology

**Teaching assistant, 2014–2016**

*Molecular biology labs, Prof. D. P. Matton, University of Montreal*

- Teaching load: 110 hours per session, 10–20 students

## Supervision of interns

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### Grad students

*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.*

- **Kelly Rodrigues**      2018-19    Ph.D.    U.F.R.G.S. (Brazil)
- **Federico Ceriotti**    2017-18    M.Sc.    Natl. Univ. of Cuyo (Argentina)
- **Carlos Bravo**        2016-17    Ph.D.    Natl. Univ. of Mexico (Mexico)
- **Laura González**      2016        Ph.D.    Natl. Univ. of Córdoba (Argentina)
- **Mariana Quiroga**    2015        Ph.D.    Natl. Univ. of Córdoba (Argentina)

### Undergrads

*I supervised these students for 4- to 6-month research internships required in their academic program.*

- **Maude Dorval**        2018        B.Sc.    Univ. of Montreal (Canada)
- 2017        DEC      Collège Ahuntsic (Canada)
- **Anna Zaro Sánchez**    2017        B.Sc.    Univ. of Barcelona (Spain)
- **Francis Banville**      2017        B.Sc.    Univ. of Montreal (Canada)
- **Andréa Davrinche**    2014        B.Sc.    P. & M. Curie Univ. (France)
- **Ella Gangbe**          2013        B.Sc.    Univ. of Montreal (Canada)
- **Tissicca Hour**        2012        B.Sc.    Univ. of Montreal (Canada)

- 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), 2015–2019</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 (≈ 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 <ul style="list-style-type: none"><li>• 3-hour lessons every week with 10-20 students</li></ul> <b>Contributor to various online projects:</b> <ul style="list-style-type: none"><li>• Writer and translator for <i>Wikipedia</i> (biology-related articles), 2008–present</li><li>• Volunteer cartographer for <i>OpenStreetMap</i>, 2015–present</li><li>• Herbarium digitalization for the Paris National Museum of Natural History (Project "<i>Les Herbonautes</i>"), 2015</li></ul>

## 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, Fedora, CentOS</i> ), Mac OS X, Windows. <b>Bioinformatics:</b> assemblers ( <i>Trinity, CLC</i> , etc.); read aligners ( <i>Bowtie, TopHat</i> , etc.); sequence search and alignment tools ( <i>BLAST</i> , etc.); annotators ( <i>BLAST2GO, PFAM-scan, SignalP</i> , etc.) <b>Office software:</b> $\text{\LaTeX}$ , <i>LibreOffice/OpenOffice, Microsoft Office</i> <b>Image processing:</b> <i>GIMP, Inkscape, ImageJ, Adobe Photoshop, Cytoscape</i> ; <i>AxioVision</i> ( <i>Zeiss</i> microscope steering program)