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.*

Education

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**

Canada | **Ph.D. Project, 2013–*present***
Prof. Daniel P. Matton, IRBV, University of Montreal
- Molecular biology: DNA/RNA techniques. Cloning. Protein expression and purification.
- Molecular biology: Plant cell culture. Pollen tube guidance assays. Microfluidics.
- Molecular biology: 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
- Molecular biology: 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
- Molecular biology: Development of microfluidic devices for pollen tube guidance assays.
- Molecular biology: Introduction to 2-photon confocal microscopy.

Research experience (continued)

⚗ Molecular biology </> Bioinformatics

USA | **International research internship, Apr.–May 2014**
Prof. Willie J. Swanson, University of Washington
</> Variant calling (GATK).
</> Molecular evolution and positive selection analysis (codeml).

Argentina | **Botanical transect, Apr.–May 2012**
Partnership with Dr. Franco E. Chiarini, Universidad Nacional de Córdoba
⚗ Collection of potato individuals in the Andes cordillera.

Canada | **Research internship, Jan.–Aug. 2011**
Prof. Daniel P. Matton, University of Montreal
⚗ Molecular cloning. Biolistics. Epifluorescence and confocal microscopy.

France | **Research internship, June–July 2010**
Prof. Christophe Bailly, CNRS/Pierre & Marie Curie University, Paris
⚗ Seed dormancy and germination biology.

Short-term introductory internship, Jan. 2009
Prof. Chris Bowler, CNRS/École Normale Supérieure, Paris
⚗ Protein electrophoresis. Immunoprecipitation. Western Blotting.

Extra training

Bioinformatics | **Online Bioinformatics Specialization, 2016–2018**
University of California San Diego, on Coursera

1. *Finding Hidden Messages in DNA.*	Certif. SPRUS2D6NH
2. *Genome Sequencing.*	Certif. 73HUUXBY64
3. *Comparing Genes, Proteins, and Genomes.*	Certif. HY7JCN6UV2
4. *Molecular Evolution.*	Certif. VYKM2WT4792A
5. *Genomic Data Science and Clustering.*	Certif. M6ZPV8VCEH
6. *Finding Mutations in DNA and Proteins.*	Certif. EVDAXLXV9L
7. *Bioinformatics Capstone: Big Data in Biology.*	Certif. 56XJX7TMHYVM
Global Specialization Certificate.	Certif. H528Q2K9KYB6

Python/R | **Bioinformatics Online Courses, 2016**
Johns Hopkins University, on Coursera

• *Python for Genomic Data Science.*	Certif. XHKWDB4XD7
• *Introduction to Genomic Technologies.*	Certif. U88T89XKR2
• *R Programming.*	Certif. X8NKEQAUU4

Sequence annotation | **International seminar in automated functional protein annotation, 2012**
BLAST2GO, University of California Davis

Publications

***Equal contributions**

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

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

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

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

upcoming | **Joly V**, Tebbji F and Matton DP. Pollination type recognition from a distance by the ovary is revealed by a global transcriptomic analysis. ***To be submitted in Oct. 2018.***

Joly V, Liu Y and Matton DP. Comparative RNA-sequencing reveals female gameotphyte-sac specific transcripts in the *frk1* embryo sac-less mutant from *Solanum chacoense*. ***To be submitted in Dec. 2018.***

Joly V and Matton DP. A transcriptomic time-course reveals developmentally regulated transcripts during ovule genesis and maturation in *Solanum chacoense*. ***To be submitted in March 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.
- Version 1.0 published under GPL license on SourceForge.

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.

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^{e} 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.

Poster presentations in scientific conferences

★ Award

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

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.

Teaching

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

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.	Univ. of São Paulo (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 interships 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)

Scholarships and Awards

★ **Major scholarship**

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 Québécois de Recherche – Nature et Technologies, CAD 13,333

Best Graduate Student Poster Award
Frontiers in Plant Reproduction 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

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

Scholarships and Awards (continued)

★ Major scholarship

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

Societies

American Society of Plant Biologists (ASPB), 2016–*present*

Canadian Society of Plant Biologists (CSPB), 2014–*present*

International Association of Sexual Plant Reproduction Research (IASPRR), 2015–*present*

Quebec Biological Association (ABQ), 2013–2018

French Botanical Society (SBF), 2010–2011

Students' associations

Naturalist Students' Association *Timarcha*, 2010–2011
Pierre & Marie Curie University (UPMC), Paris, France

Environmental Committee *Éco-école*, 2006–2008
Lycée Saint-Sauveur (≈ high school), Redon, France

Volunteering

Volunteer French teacher for newcomers to Canada, 2015–2016
Community Center *The House of Friendship*, Montreal, QC, Canada
• 3-hour lessons every week with 10-20 students

Contributor to various online projects:
• Writer and translator for *Wikipedia* (biology-related articles), 2008–*present*
• Volunteer cartographer for *OpenStreetMap*, 2015–*present*
• Herbarium digitalization for the Paris National Museum of Natural History (Project "*Les Herbonautes*"), 2015

Other skills

Languages

French, mother tongue
English, fluent
Spanish, fluent
Italian, intermediate
Esperanto and Japanese, beginner

Computing

Programming: Python and R. Bases in C and Perl.

Web: HTML/CSS, Jekyll.

Operating systems: Linux (*Ubuntu*, *Fedora*, *CentOS*), Mac OS X, Windows.

Bioinformatics: assemblers (*Trinity*, *CLC*, etc.); read aligners (*Bowtie*, *TopHat*, etc.); sequence search and alignment tools (*BLAST*, etc.); annotators (*BLAST2GO*, *PFAM-scan*, *SignalP*, etc.)

Office software: LaTeX, *LibreOffice*/*OpenOffice*, *Microsoft Office*

Image processing: *GIMP*, *Inkscape*, *ImageJ*, *Adobe Photoshop*, *Cytoscape* ; *AxioVision* (*Zeiss* microscope steering program)