JEAN-GABRIEL YOUNG
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RESEARCH INTERESTS: Statistical Inference, Epidemiology, Complex Networks, Complex Systems

ACADEMIC POSITIONS

- *University of Vermont*, Assistant Professor, Department of Mathematics and Statistics[*]   2021–
- *Université Laval*, Professeur Associé Département de Physique   2020–
- *University of Vermont*, Research Assistant Professor, Department of Computer Science   2020–2021
- *University of Michigan*, Postdoctoral Fellow, Center for the Study of Complex Systems   2018–2020
- *Université Laval*, Research Assistant, Group of Prof. Louis. J. Dubé   2012–2018

EDUCATION

Ph.D. in Physics, Université Laval   2014–2018
- *Thesis title*: Inférence et réseaux complexes [†]
- *Advisors*: Louis J. Dubé and Patrick Desrosiers

M.Sc. in Physics, Université Laval   2012–2014
- *Thesis title*: De la détection de la structure communautaire des réseaux complexes [‡]
- *Advisors*: Louis J. Dubé

B.Sc. in Physics, Theoretical Physics major, Université Laval   2009–2012

SCHOLARSHIPS, GRANTS AND AWARDS

Fellowships and Scholarships
- *Postdoctoral Fellowship in Studying Complex Systems*, James S. MacDonnell Foundation (**$200 000**)   2017
- *Doctoral Research Scholarship*, Fonds de recherche du Québec – Nature et Technologies (**$60 000**)   2014

Grants
- *OVPR Express Grant*, University of Vermont (**$3000**, PI)   2021
- *YRNCS Bridge Grant*, Young Researcher Network On Complex Systems (**€1000**, PI)   2016

Awards
- *FOSS Award*, 2021 Mining Software Repositories Conference   2021
- *Zachary Karate Club Club* award   2021
- *Best oral presentation award*, NERCCS 2020   2020
- *Board of Honour* (Highest overall mark award by all committee members), Ph.D thesis, Université Laval   2018
- *Concours d'expression scientifique Pierre Amiot*, Physics Department, Université Laval   2016

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[*]**Secondary appointement with**: Vermont Complex Systems Center, Larner College of Medicine, Department of Computer Science
[†]Inference and complex networks
[‡]Of community structure detection on complex networks

PUBLICATIONS

Peer-reviewed journals (27)

27. Spatial epidemiology and adaptive targeted sampling to manage the Chagas   2022
disease vector Triatoma dimidiata
B. K. M. Case, **J.-G. Young**, D. Penados, L. Hébert-Dufresne, and L. Stevens
PLOS Negl. Trop. Dis. 16, e0010436

26. Impact and dynamics of hate and counter speech online   2022
J. Garland, K. Ghazi-Zahedi, **J.-G. Young**, L. Hébert-Dufresne and M. Galesic
EPJ Data Sci. 11, 3

25. Clustering of heterogeneous populations of networks   2022
J.-G. Young, A. Kirkley and M. E. J. Newman
Phys. Rev. E 105, 014312

24. Reconstruction of plant–pollinator networks from observational data   2021
J.-G. Young, F. S. Valdovinos and M. E. J. Newman
Nat. Commun. 12, 3911

23. Hypergraph reconstruction from network data[§]   2021
J.-G. Young, G. Petri and T. P. Peixoto
Commun. Phys. 4, 135

22. A clarified typology of core-periphery structure in networks   2021
R. J. Gallagher, **J.-G. Young** and B. Foucault Welles
Sci. Adv. 7, eabc9800

21. Bayesian inference of network structure from unreliable data   2021
J.-G. Young, G. T. Cantwell and M. E. J. Newman
J. Complex. Netw. 8, cnaa046

20. Inference, model selection, and the combinatorics for growing trees   2021
G. T. Cantwell, G. St-Onge and **J.-G. Young**
Phys. Rev. Lett. 126, 038301

19. Networks beyond pairwise interactions: structure and dynamics (*review*)   2020
F. Battiston, G. Cencetti, I. Iacopini, V. Latora, M. Lucas, A. Patania, **J.-G. Young** and G. Petri
Phys. Rep. 874

18. Improved mutual information measure for classification and community detection   2020
M. E. J. Newman, G. T. Cantwell and **J.-G. Young**
Phys. Rev. E 101, 042304

17. Macroscopic patterns of interacting contagions are indistinguishable from social reinforcement   2020
L. Hébert-Dufresne, S. V. Scarpino and **J.-G. Young**
Nat. Phys. 16, 426

16. Phase transition in the recoverability of network history   2019
J.-G. Young, G. St-Onge, E. Laurence, C. Murphy, L. Hébert-Dufresne and P. Desrosiers
Phys. Rev. X 9, 041056

15. Efficient sampling of spreading processes on complex networks using a composition and   2019
rejection algorithm
G. St-Onge, **J.-G. Young**, L. Hébert-Dufresne and L. J. Dubé
Comput. Phys. Commun. 240, 30

14. Universality of the stochastic block model   2018
J.-G. Young, G. St-Onges, P. Desrosiers and L.J.Dubé
Phys. Rev. E 98, 032309

13. Exact analytical solution of irreversible binary dynamics on networks   2018
E. Laurence, **J.-G. Young**, S. Melnik and L.J.Dubé
Phys. Rev. E 97, 032302

[§]Appears in the Focus Collection on Higher-order Interaction Networks

12. Phase transition of the susceptible-infected-susceptible dynamics on time-varying configuration model networks
G. St-Onge, **J.-G. Young**, E. Laurence, C. Murphy and L. J. Dubé
Phys. Rev. E 97, 022305   2018

11. Construction of and efficient sampling from the simplicial configuration model
J.-G. Young, G. Petri, F. Vaccarino and A. Patania
Phys. Rev. E 96, 032312   2017

10. Strategic tradeoffs in competitor dynamics on adaptive networks
L. Hébert-Dufresne, A. Allard, P.-A. Noël, **J.-G. Young**, and E. Libby
Sci. Rep. 7, 7576   2017

9. Finite size analysis of the detectability limit of the stochastic block model
J.-G. Young, P. Desrosiers, L. Hébert-Dufresne, E. Laurence and L. J. Dubé
Phys. Rev. E 95, 062304   2017

8. Growing networks of overlapping communities with internal structure
J.-G. Young, L. Hébert-Dufresne, A. Allard and L. J. Dubé
Phys. Rev. E 94, 022317   2016

7. Constrained growth of complex scale-independent systems [¶]
L. Hébert-Dufresne, A. Allard, **J.-G. Young** and L. J. Dubé
Phys. Rev. E 93, 032304   2016

6. Complex networks as an emerging property of hierarchical preferential attachment
L. Hébert-Dufresne, E. Laurence, A. Allard, **J.-G. Young** and L. J. Dubé
Phys. Rev. E 92, 062809   2015

5. General and exact approach to percolation on random graphs
A. Allard, L. Hébert-Dufresne, **J.-G. Young** and L. J. Dubé
Phys. Rev. E 92, 062807   2015

4. A shadowing problem in the detection of overlapping communities
J.-G. Young, A. Allard, L. Hébert-Dufresne and L. J. Dubé
PLOS ONE 10, e0140133   2015

3. Coexistence of phases and the observability of random graphs [¶]
A. Allard, L. Hébert-Dufresne, **J.-G. Young** and L. J. Dubé
Phys. Rev. E 89, 022801   2014

2. Percolation on random networks with arbitrary k-core structure
L. Hébert-Dufresne, A. Allard, **J.-G. Young** and L. J. Dubé
Phys. Rev. E 88, 062820   2013

1. Global efficiency of local immunization on complex networks
L. Hébert-Dufresne, A. Allard, **J.-G. Young** and L. J. Dubé
Sci. Rep. 3, 2171   2013

Peer-reviewed conference proceeding (5)

5. Cutting through the noise to infer autonomous system topology
K. G. Leyba, J. J. Daymude, **J.-G. Young**, M. E. J. Newman, J. Rexford and S. Forrest
INFOCOM 2022, Proceedings of the 2022 IEEE International Conference
on Computer Communications, pp. 1609–1618.   2022

4. The OCEAN mailing list data set: Network analysis spanning mailing lists and code repositories
M. Warrick, S. F. Rosenblatt, **J.-G. Young**, L. Hébert-Dufresne and J. P. Bagrow
MSR 2022, Proceedings of the 19th International Conference on Mining Software Repositories   2022

3. Which contributions count? Analysis of attribution in open source
J.-G. Young, A. Casari, K. McLaughlin, M. Z. Trujillo, L. Hébert-Dufresne and J. P. Bagrow
MSR 2021, Proceedings of the 18th International Conference on Mining Software Repositories   2021

2. Countering hate on social media: Large scale classification of hate and counter speech
J. Garland, K. Ghazi-Zahedi, **J.-G. Young**, L. Hébert-Dufresne and M. Galesic
ACL 2020, Proceedings of the Fourth Workshop on Online Abuse and Harms, pp. 102–112.   2020

[¶]Editors' suggestion

1. Connected graphs with a given degree sequence: 2020
   Efficient sampling, correlations, community detection and robustness
   J. Ring IV, **J.-G. Young** and L. Hébert-Dufresne.
   NetSci-X 2020, Proceedings of NetSci-X 2020: Sixth International Winter School and
   Conference on Network Science, pp. 33–47.

Other edited works (1)

2. Book review: Book review: Advances in Network Clustering and Blockmodeling   2022
   J.-G. Young
   J. Soc. Struct. 23, 47

1. Open source ecosystems need equitable credit across contributions   2021
   A. Casari, K. McLaughlin, M. Z. Trujillo, **J.-G. Young**, J. P. Bagrow and L. Hébert-Dufresne
   Nat. Comput. Sci. 1, 2

Preprints in submission (6)

- Opposing responses to scarcity emerge from functionally unique sociality drivers
  A. B. Kao, A. K. Hund, F. P. Santos, **J.-G. Young**, D. Bhat, J. Garland, R. A. Oomen and H. F. McCreery
  Based on: bioRxiv:2020/994343
  Under review, *Am. Nat.*

- The network epidemiology of an Ebola epidemic
  L. Hébert-Dufresne, **J.-G. Young**, J. Bedson, L. Skrip, D. Pedi, M. F. Jalloh, B. Raulier,
  O. Lapointe-Gagné, A. Jambai, A. Allard and B. Althouse
  arXiv:2111.08686
  Under review, *Nature*

- Latent network models to account for noisy, multiply-reported social network data
  C. De Bacco, M. Contisciani, J. Cardoso-Silva, H. Safdari, D. Theuerkauf, T. Sweet,
  J.-G. Young, J. Koster, C. Ross, R. McElreath, D. Redhead, E. A. Power
  arXiv:2112.11396
  Under review, *J. R. Stat. Soc. A*

- The promise of trans-species coexpression analysis in studying
  the coevolution and ecology of host-parasite interactions.
  A. Hund, P. Tiffin, **J.-G. Young**, and D. Bolnick
  arXiv:2206.12711
  Submitted, *Evolution*

- Hypergraph reconstruction from noisy data
  S. Lizotte, **J.-G. Young**, and A. Allard
  arXiv:2208.06503
  Submitted, *Communication Physics.*

- Network Onion Divergence: Network representation and comparison using nested
  configuration models with fixed connectivity, correlation and centrality pattern
  L. Hébert-Dufresne, **J.-G. Young**, A. Daniels and A. Allard
  arXiv:2204.08444

TEACHING AND MENTORING

Instructor

- STAT-330: *Bayesian Statistics*   F2021, F2022
- STAT-395: *Statistical Network Analysis*   S2021

Schools and guest lectures

- CSYS/CS 302: Modeling Complex Systems, University of Vermont, Burlington VT ,   2020, 2021
- CNWW2020: Complex Networks Winter Workshop, Québec, Canada   2020
- CRM Summer School: Spectral Theory and Applications, Québec, Canada   2016

Supervision

- Postdoctoral fellows:
    - ◇ Nicholas W. Landry, University of Vermont   2022–
- Ph.D. students:
    - ◇ Simon Lizotte, Université Laval (co-direction with Antoine Allard)   2022–
    - ◇ A. Daniels, University of Vermont   2022–
    - ◇ Jonathan St-Onge, University of Vermont   2022–
    - ◇ Nicholas J. Robert, University of Vermont   2021–
    - ◇ B. K. M. Case, University of Vermont   2021–
- Master's students:
    - ◇ Erik Weis, University of Vermont   2021–
    - ◇ Frederick Hall, University of Vermont   2021–
    - ◇ Simon Lizotte, Université Laval (co-direction with Antoine Allard)   2020–2022
- Undergraduate students:
    - ◇ Trevor Blanchard (Honors Thesis), University of Vermont   AY 22/23

INVITED TALKS AND SELECTED CONFERENCE CONTRIBUTIONS

- *"Uncertain Network Science"*   2021–2022
    - ▷ Channing Network Science Seminar, Boston MA, USA (invited seminar)
    - ▷ NERCCS 2022 conference, Buffalo, NY, USA (invited plenary)
    - ▷ University of Vermont — Seminar in Mechanical Engineering, Burlington VT, USA (invited seminar)
    - ▷ Central European University, Department of Network and Data Science (invited seminar)

- *"Which contributions count? Analysis of attribution in open source"*   2021
  MSR2021, online (talk)

- *"Inference with growing networks"*   2021
  CNWW2020, online (invited talk)

- *"Bayesian approaches to network epidemiology"*   2020
  HONS 2020, online (invited talk)

- *"Paper Unwind: Network archaeology"*   2020
  School of the NERCCS 2020 conference, Buffalo, NY, USA (invited talk)

- *"Efficient and fully bayesian inference of complex networks from noisy data"*   2019–2020
    - ▷ Indiana University — CNETS, Bloomington, IN, USA (invited seminar)
    - ▷ Université Laval — CIMMUL, Québec, QC, Canada (invited seminar)
    - ▷ Netsci-X 2020, Tokyo, Japan (talk)
    - ▷ NERCCS 2020, Buffalo, NY, USA (talk, best presentation award)
    - ▷ University of Michigan — Jacobs Lab (UMSI), Ann Arbor MI, USA (invited seminar)
    - ▷ Indiana University — Betzel Lab, Bloomington, IN, USA (invited seminar)
    - ▷ Netsci 2020, online (talk)

- *"Compression of treelike complex networks using layered configuration models"*   2019
  Netsci 2019, Burlington, VT, USA (talk)

- *"Bayesian inference of effective contagion models from population level data"*   2019
  SINM 2019, Burlington, VT, USA (talk)

- *"Universality of the stochastic block model"*   2019
  SYNS Warm-up Event 2019, Burlington, VT, USA (invited talk)

- *"The statistical physics of inference for Complex Networks"*   2018
  Department of Physics Colloquium Oakland University, Rochester, MI, USA (invited seminar)

- *"Network archaeology: phase transition in the recoverability of network history"*   2018
    - ▷ Univeristy of Colorado Boulder — StatOptML seminar, Boulder, CO, USA (invited seminar)
    - ▷ Univeristy of Vermont — Vermont Complex Systems Center, Burlington, VT, USA (invited seminar)
    - ▷ Netsci 2018, Paris, France (talk)
    - ▷ Sentinel North 2018 Annual Meeting, Québec, Canada (plenary)
    - ▷ Univeristy of Bath — Centre for Networks and Collective Behaviour, Bath, UK (invited seminar)

  ▷ Connected Past 2018, Oxford, UK (talk)

- *"Construction of and efficient sampling from the simplicial configuration model"*   2017
  ▷ HONS 2017, Indianapolis, IN, USA (invited talk)
  ▷ Indiana University — School of Informatics, Bloomington, IN, USA (invited seminar)
  ▷ University of Michigan — Center for the Study of Complex Systems, Ann Arbor, MI, USA (invited talk)

- *"Statistical mechanics of mesoscopic structure extraction"*   2017
  Netsci 2017, Indianapolis, IN, USA (talk)

- *"Finite size analysis of the detectability limit of the stochastic block model"*   2016
  ▷ Netsci 2016, Seoul, Korea (lightning talk)
  ▷ SINM 2016, Seoul, Korea (talk)
  ▷ ISI Foundation, Torino, Italy (invited seminar)

- *"Structural preferential attachment: scale-free benchmark for overlapping community detection algorithms"*   2015
  Netsci 2015, Zaragoza, Spain (poster)

- *"Structural preferential attachment of community structure and its relation to Dunbar's number"*   2014
  Netsci 2014, Berkeley, CA, USA (talk)

- *"Complex networks are an emerging property of hierarchical preferential attachment"*[‖]   2014
  NetSci 2014 Science, Berkeley, CA, USA (poster)

- *"Local and global solutions to community detection: when resolution matters"*   2013
  NetSci 2013 , Copenhagen, Denmark (poster)

LEADERSHIP AND SERVICE

Organizer

- *Satellite location organizer (UVM)*, NERCCS 2022   2022
- *Organizer*, SINM (Statistical Inference for Network Models)   2021, 2022
- *Organizer*, SIAM DS 21 Mini-Symposium on Dynamics in Higher-Order Networks, online   2021
- *Co-director*, CNWW2021, Complex Networks Winter Workshop, Québec, Canada   2021
- *Program co-chair*, First OpenNetSci Hackathon, Burlington VT, USA   2019
- *Adjacent Activities Committee*, NetSci 2019, Burlington VT, USA   2019

Service

- *AUR Maintainer*, Several python packages   *ongoing*
- *Contributor*, Several open-source projects   *ongoing*
- *Seminar chair*, STAT@UVM   2022–
- *Seminar chair*, Vermont Complex Systems Center   2021–
- *Board member*, Student Investment Fund, Université Laval   2013–2016
- *Technical Director*, Coupe de Science (Science Cup), Université Laval   2011–2014
- *Technical Director*, Festival de Sciences et Génies (Science and Engineering Festival)   2010–2012

Reviewer

- *Grants*: Panelist, NSF, IIS Division (2019).
- *Journals* (27): Science Advances, SIAM Review, Physical Review Letters, Physical Review X, Psychological Methods, PLOS Computational Biology, Physical Review E, Physical Review Research, EPJ Data Science, Scientific Data, Cambridge Elements, EPL, Journal of Open Source Software, Journal of Physics: Complexity, Journal of Physics A, Scientific Reports, Palgrave Communications, PLOS ONE, Journal of Complex Networks, Physics Letter A, Chaos Solitons & Fractals, Entropy, Network Science, Animal Behaviour, Applied Network Science, Journal of Computational Science, Chaos.

Program committee

- Northeast Regional Conference on Complex Systems (NERCCS)   2020, 2021, 2022

[‖] Outstanding poster award

- International School and Conference on Network Science (NetSci)   2019, 2020
- SIAM Workshop on Network Science (SIAM NS)   2018, 2020

SELECTED SOFTWARE

(Complete list available online)

- Bayesian inference of networks from noisy data (stan)
- Bayesian inference of effective contagion models from population level data (stan)
- Reconstruction of plant–pollinator networks from observational data (stan + python)
- Sequential MC sampler for Network Archaeology (python + C++)
- MCMC sampler for the Simplicial Configuration Model (C++)
- MCMC sampler for the Stochastic Block Model (C++)
- Structural Preferential Attachment community detection benchmark (C++)

VARIA

Selected media coverage

- "*A selection of 2020's highlighted research*." Nature   2021
- "*To find the right network model, compare all possible histories*." Phys.org   2021
- "*Fighting Hate Speech with AI & Social Science*," Complexity Podcast   2020
- "*How you talk about coronavirus actually impacts its spread*," cnet   2020
- "*Neue Studie zeigt Wirksamkeit von Gegenrede im Netz*," netzpolitik.org   2020
- "*When coronavirus is not alone*," Phys.org   2020
- "*The shape of randomness*." Physics Central   2017
- "*What algae can tell us about political strategy*." Phys.org   2017
- "*L'univers complexe de Jean-Gabriel Young*." Le Soleil (French)   2017