

THE UNIVERSITY OF BRITISH COLUMBIA
Curriculum Vitae for Faculty Members

Date: April 15, 2021

Initials: JP

1. **SURNAME:** Paat **FIRST NAME:** Joseph
MIDDLE NAME(S): Stephen
2. **DEPARTMENT/SCHOOL:** Division of Operations and Logistics
3. **FACULTY:** Sauder School of Business
4. **PRESENT RANK:** Assistant Professor **SINCE:** Sept. 2020
5. **POST-SECONDARY EDUCATION**

University or Institution	Degree	Subject Area	Dates
Denison University	BS	Math and Computer Science	2007 - 2011
Wake Forest University	MA	Math	2011 - 2013
Johns Hopkins University	PhD	Applied Math and Statistics	2013 - 2017

Special Professional Qualifications

6. **EMPLOYMENT RECORD**

(a) *Prior to coming to UBC*

University, Company or Organization	Rank or Title	Dates
ETH Zurich, Mathematics Department	Postdoctoral Researcher	2017 - 2020

(b) *At UBC*

Rank or Title	Dates
Assistant Professor	Sept. 2020

7. **LEAVES OF ABSENCE**

8. **TEACHING**

(a) *Areas of special interest and accomplishments*

Undergraduate courses taught at Johns Hopkins University: *Discrete Mathematics, Statistical Analysis 2*

Graduate courses taught at ETH Zurich: *Geometric Integer Programming*

(b) *Courses Taught at UBC*

Session	Course	Scheduled	Class	Hours Taught
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	Number	Hours	Size	Lectures	Tutorials	Labs	Other
2020 W2	COMM 204-202	1.5*25 = 37.5	55	37.5			
2020 W2	COMM 204-203	1.5*25 = 37.5	57	37.5			
2020 W2	COMM 204-204	1.5*25 = 37.5	54	37.5			

(c) **Graduate Research Supervision**

(d) **Graduate Program Supervision**

(e) **Continuing Education Activities**

(f) **Visiting Lecturer (indicate university/organization and dates)**

"Proximity in integer programming". Otto von Guericke University, Dept. of Mathematics, Magdeburg, DE, June 2019.

9. **SCHOLARLY AND PROFESSIONAL ACTIVITIES**

(a) **Areas of special interest and accomplishments**

Mixed integer programming, polyhedral combinatorics, combinatorial optimization, parametric optimization

(b) **Research or equivalent grants (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))**

Granting Agency	Subject	COMP	\$ per year	Year	Principal Investigator	Co-PI
AMS	Simons Foundation Travel Grant	C	2,600	2017 - 2018	J. Paat	
NSERC	Discovery Grant: Dimension reduction techniques for mixed integer programs	C	36,000	2021-2026	J. Paat	
NSERC	Discovery Launch Supplement: Dimension reduction techniques for mixed integer programs	C	12,500	One time, awarded 2021	J.Paat	

(c) **Invited Presentations (Identify whether International/National/Local)**

"Using mixed integer techniques to analyze integer programs". IAM Seminar, University of British Columbia, CA, Oct. 2020.

"Recent proximity results in integer programming". Tutte Colloquium, University of Waterloo, CA, Sept. 2020.

"Recent proximity results in integer programming". OpLog Seminar, University of British Columbia, CA, Sept. 2020.

"The distribution of functions related to integer optimization". University of Erlangen-Nuremberg, Dept. of Mathematics, Erlangen, DE, Aug. 2019.

"Proximity results in MIP". Otto von Guericke University, Dept. of Mathematics, Magdeburg, DE, June 2019.

"The distribution of the proximity function". Cardiff University, Dept. of Mathematics, Cardiff, UK, March 2019.

"Proximity of optimal solutions of MIPs". ETH Zurich, Automatic Control Laboratory, Zurich, CH, Nov. 2018.

"The effect of reducing sub determinants in integer programming". Cardiff University, Dept. of Mathematics, Cardiff, UK, Nov. 2017.

(e) Other Presentations

Poster presentations

"Approximation of corner polyhedra with families of intersection cuts". Mixed Integer Programming Workshop Poster Session, Miami, USA, May 2016.

"Non-unique liftings of cut-generating functions". Conference on Integer Programming and Combinatorial Optimization, Liege, BE, June 2016.

(f) Other

(g) Conference Participation (Organizer, Keynote Speaker, etc.)

Conference and workshop presentations

"The integrality number of an integer program". INFORMS Annual Meeting, USA, Held Virtually, Nov. 2020

"The integrality number of an integer program". Conference on Integer Programming and Combinatorial Optimization, London, UK, June 2020.

"Constructing lattice-free gradient polyhedra in dimension two". Conference on Integer Programming and Combinatorial Optimization, London, UK, June 2020.

"The proximity function for IPs". Combinatorial Optimization Workshop, Aussois, FR, Jan. 2019.

"Using the geometry of S-free sets to find mixed-integer cut-generating functions". International Symposium on Mathematical Programming, Bodeaux, FR, July 2018.

"Revisiting questions in IP by reparameterizations". Mixed Integer Programming Workshop, Greenville, USA, June 2018.

"The distance between optimal IP solutions and optimal solutions of MIP relaxations". International Symposium on Combinatorial Optimization, Marrakech, MA, April 2018.

"Proximity of optimal solutions of LP, IP, and MIP". Combinatorial Optimization Workshop, Aussois, FR, Jan. 2018.

"Approximation of corner polyhedra with families of intersection cuts". OR2017 Berlin: Annual Conference of the German Operations Research Society, Berlin, DE, Sept. 2017.

"Approximation of corner polyhedra with families of intersection cuts". Conference on Integer Programming and Combinatorial Optimization, Waterloo, CA, July 2017

"Conflict-free railway track assignment at depots". International Conference on Railway Operations Modeling and Analysis, Lille, FR, April 2017.

"How to choose what you lift". INFORMS Computing Society Conference, Austin, USA, Jan. 2017.

"Approximation of corner polyhedra with families of intersection cuts". INFORMS Computing Society Conference, Austin, USA, Jan. 2017.

"Approximation guarantees of closures". INFORMS Annual Meeting, Nashville, USA, Nov. 2016.

"Extreme functions with an infinite number of slopes". Conference on Integer Programming and Combinatorial Optimization, Liege, BE, June 2016.

"Extreme functions with an infinite number of slopes". Combinatorial Optimization Workshop, Aussois, FR, Jan. 2016.

"Operations that preserve the covering property of the lifting region". International Symposium on Mathematical Programming, Pittsburgh, PA, July 2015.

"Operations that preserve the covering property of the lifting region". INFORMS Computing Society Conference, Richmond, VA, Jan. 2015.

10. **SERVICE TO THE UNIVERSITY**

11. **SERVICE TO THE COMMUNITY**

(a) ***Memberships on scholarly societies, including offices held and dates***

Institute for Operations Research and the Management Sciences (INFORMS), 2020 - Present

(b) ***Memberships on other societies, including offices held and dates***

(c) ***Memberships on scholarly committees, including offices held and dates***

(d) ***Memberships on other committees, including offices held and dates***

(e) ***Editorships (list journal and dates)***

(f) ***Reviewer (journal, agency, etc. including dates)***

I have reviewed papers for the following journals and conferences (counts do not include revisions of papers):

Mathematics of Operations Research (3x), SIAM Journal on Discrete Mathematics (1x), Mathematical Programming Series A and B (8x), INFORMS Journal on Computing (1x), Discrete Optimization (4x), International Symposium on Combinatorial Optimization (1x), Operations Research (1x), SIAM Journal on Optimization (3x), European Journal of Operational Research (1x), International Colloquium on Automata, Languages and Programming (1x), Integer Programming and Combinatorial Optimization (4x), Journal of Optimization Theory and Applications (2x), INFORMS Journal on Optimization (1x), Management Science (1x)

(g) ***External examiner (indicate universities and dates)***

(h) ***Consultant (indicate organization and dates)***

(i) ***Other service to the community***

12. **AWARDS AND DISTINCTIONS**

(a) ***Awards for Teaching (indicate name of award, awarding organizations, date)***

Joel Dean Award for Excellence in Teaching, Johns Hopkins University, USA, 2015 - 2016

(b) Awards for Scholarship (indicate name of award, awarding organizations, date)

Travel award for poster presentation at the Mixed Integer Programming Workshop, Miami, USA, June 2016

Best poster award at the Mixed Integer Programming Workshop, Miami, USA, June 2016

Newman Family Research Fellowship, Johns Hopkins University, USA, Sept. 2014 - Sept. 2017

Harriet H. Cohen Engineering Fellowship, Johns Hopkins University, USA, Sept. 2014 - Sept. 2017

(c) Awards for Service (indicate name of award, awarding organizations, date)

(d) Other awards

13. OTHER RELEVANT INFORMATION (Maximum One Page)

Co-supervisor of undergraduate student Lujing Chen, ETH Zurich, CH
Project title : Online inverse optimization for structured models
Defense Date: December, 2019.

1. REFEREED PUBLICATIONS

***As typical with the field, authors are listed in alphabetical order with the assumption of equal contribution.**

(a) Journals

Paat J., Schlöter M., Weismantel R. "*The integrality number of an integer program.*" Mathematical Programming, <https://doi.org/10.1007/s10107-021-01651-0>, First online March 2021.

Oertel T., **Paat J.**, Weismantel R. "*The distributions of functions related to parametric integer optimization.*" SIAM Journal on Applied Algebra and Geometry, 4(3), 422-440, <https://doi.org/10.1137/19M1275954>, Sept. 2020.

Basu A., Dey S.S., **Paat J.** "*Nonunique lifting of integer variables in minimal inequalities.*" SIAM Journal on Discrete Mathematics, 33(2), 755-783, <https://doi.org/10.1137/17M1117070>, May 2019

Basu A., Conforti M., Di Summa M., **Paat J.** "*The structure of the infinite models in integer programming.*" Mathematics of Operations Research, 44(4), 1145-1509, <https://doi.org/10.1287/moor.2018.0977> July 2019.

Paat J., Weismantel R., Weltge S. "*Distances between optimal solutions of mixed-integer programs.*" Mathematical Programming, 179, 455-468, <https://doi.org/10.1007/s10107-018-1323-z>, Jan. 2020. First online August 2018.

Gilg B., Klug T., Martiensen R., **Paat J.**, Schlechte T., Schulz C., Seymen S., Tesch A. "*Conflict-free railway track assignment at depots.*" Journal of Rail Transport Planning and Management, 8(1), 16 - 28, <https://doi.org/10.1016/j.jrtpm.2017.12.004>, June 2018.

Averkov G., Basu A., **Paat J.** "*Approximation of corner polyhedra with families of intersection cuts.*" SIAM Journal on Optimization, 28(1), 904-929, <https://doi.org/10.1137/17M1128939>, March 2018.

Basu A., Conforti M., Di Summa M., **Paat J.** "*Extreme functions with an arbitrary number of slopes.*" Mathematical Programming, 172, 303-327, <https://doi.org/10.1007/s10107-017-1184-x>, Nov. 2018. First online July 2017.

Lee H.J., Ludwig L., **Paat J.**, Peiffer A. "*Knot Mosaic Tabulation*"
Involve, a Journal of Mathematics, 11(1), 13-26, 10.2140/involve.2018.11.13, July 2017.

Basu A., **Paat J.** "*Operations that preserve the covering property of the lifting region.*"
SIAM Journal on Optimization, 25(4), 2313-2333, <https://doi.org/10.1137/140990413>, Nov. 2015.

Evans E., Ludwig L., **Paat J.** "*An infinite family of knots whose mosaic number is realized in non-reduced projections*". Journal of Knot Theory and Its Ramifications, 22(07), <https://doi.org/10.1142/S0218216513500363>, July 2013.

(b) Conference Proceedings

Lee J., **Paat J.**, Stallknecht I., Xu L. "*Improving proximity bounds using sparsity.*" In: Baïou M., Gendron B., Günlük O., Mahjoub A.R. (Eds) Combinatorial Optimization. ISCO 2020. Lecture Notes in Computer Science, vol 12176. Springer, Cham. https://doi.org/10.1007/978-3-030-53262-8_102020, July 2020.

Paat J., Schlöter M., Speakman E. "*Constructing lattice-free gradient polyhedra in dimension two.*" In: Bienstock D., Zambelli G. (eds) Integer Programming and Combinatorial Optimization. IPCO 2020. Lecture Notes in Computer Science, vol 12125. Springer, Cham. https://doi.org/10.1007/978-3-030-45771-6_28, April 2020.

Oertel T., **Paat J.**, Weismantel R. "*Sparsity of integer solutions in the average case.*" In: Lodi A., Nagarajan V. (eds) Integer Programming and Combinatorial Optimization. IPCO 2019. Lecture Notes in Computer Science, vol 11480. Springer, Cham. https://doi.org/10.1007/978-3-030-17953-3_26, April 2019.

(c) Other

2. NON-REFEREED PUBLICATIONS

3. BOOKS

4. PATENTS

5. SPECIAL COPYRIGHTS

6. ARTISTIC WORKS, PERFORMANCES, DESIGNS

7. OTHER WORKS

8. WORK SUBMITTED (including publisher and date of submission)

Paat J., Schlöter M., Speakman E. *Constructing lattice-free gradient polyhedra in dimension two*. Major revision at Mathematical Programming, September 2020.

A small portion of this journal version appeared in the conference proceeding of the same name.