

## Travis LaCroix | CURRICULUM VITAE

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CONTACT INFORMATION	✉ 740 Social Science Tower University of California, Irvine Department of Logic and Philosophy of Science 3151 Social Sciences Plaza Irvine, CA 92697-5100	✉ tlacroix@uci.edu 🌐 travislacroix.github.io 🌐 uci.academia.edu/tlacroix
CITIZENSHIP	Canada	
AREAS OF SPECIALISATION	Philosophy of Biology & Behavioural Science Philosophy of Language & Linguistics	
AREAS OF COMPETENCE	Dynamical Systems Formal & Traditional Epistemology Evolutionary Game Theory	
EDUCATION	<b>University of California, Irvine</b> , Irvine, California USA Ph.D, Philosophy, June 2020 (Expected). GPA: 3.95/4.00 <i>Department of Logic and Philosophy of Science</i> Dissertation: “Complex Signals: Modularity, Reflexivity, & Hierarchical Structure” Committee: Jeffrey Barrett (Chair) Brian Skyrms Simon Huttegger Cailin O’Connor  M.A., Social Science, March 2018 <i>Institute for Mathematical Behavioral Science</i>  <b>University of St. Andrews</b> , St. Andrews, Scotland Diverse Intelligences Summer Institute, Summer 2019.  <b>Simon Fraser University</b> , Burnaby, British Columbia CAN M.A., Philosophy, April 2016. GPA: 4.05/4.33  Thesis Topic: “On Signaling Games and Their Models” Committee: Nicolas Fillion (Chair) Matt DeVos  <b>University of British Columbia</b> , Vancouver, British Columbia CAN B.A. (Hons.), Philosophy; English Literature, April 2014. GPA: 81.5/100 First Class standing  <b>Camosun College</b> , Victoria, British Columbia CAN A.A., English, April 2011. GPA: 8.14/9	
APPOINTMENTS	<b>Montréal Institute for Learning Algorithms</b> , Montréal, Québec CAN Visiting Researcher, July 2018 – June 2020 Supervisor: Yoshua Bengio	

PUBLICATIONS

**Refereed Journal Articles**

1. LaCroix, Travis. 2018. “On Salience and Signaling in Sender-Receiver Games: Partial Pooling, Learning, and Focal Points.” *Synthese* (Forthcoming).  
[doi.org/10.1007/s11229-018-1766-z](https://doi.org/10.1007/s11229-018-1766-z)

**Papers Under Review**

*(Draft available upon request)*

- “(Apparent) Coincidences and the Grain of Explanation”
- “The Correction Game”
- “Evolutionary Explanations of Simple Communication”
- “Power by Association” (w/ C. O’Connor)
- “Self-Assembly and Logical Operations”
- “What Russell Can Denote”

**Selected Working Papers**

*(Draft available upon request)*

- “Fake News!” (w/ C. O’Connor & A. Geil)
- “Less is More: Degrees of Compositionality for Complex Signals”
- “Polysemy and Role-Asymmetry in the Evolution of Compositional Signals”
- “Principle of Indifference” (w/ J. A. Barrett)
- “Reference by Proxy and Truth-in-a-Model”
- “Saltationism v. Gradualism”
- “Selfish Emergent Communication” (w/ M. Noukhovitch & A. Courville)
- “State Partitions and Information Transfer”

**Popular Media**

1. “Academics Have a Responsibility to Distribute Accurate Data.” (Published as “It’s not a woman’s world just yet.”) *Ottawa Citizen* (November 6, 2017).

CONFERENCE

PRESENTATIONS

**Refereed Talks**

**2019**

15. “Using Logic to Evolve More Logic: Composing Logical Operators via Self-Assembly”  
**Logic, Methodology, and Philosophy of Science and Technology**  
 Prague, Czechia, 5–10 August 2019.
14. “The Correction Game or, How Pre-Evolved Communicative Dispositions Might Affect Communicative Dispositions”  
**Formal Epistemology Workshop**  
 Turin, Italy, 19–21 June 2019.
13. “Accounting For Role-Asymmetries In the Evolution of Compositional Signals”  
**Canadian Philosophical Association**  
 Vancouver, Canada, 1–4 June 2019.

12. “Using Logic to Evolve More Logic: Composing Logical Operators via Self-Assembly”  
**Society for Exact Philosophy**  
Toronto, Canada, 17–19 May 2019.

11. “Using Logic to Evolve More Logic: Composing Logical Operators via Self-Assembly”  
**American Philosophical Association, Pacific Division**  
Vancouver, Canada, 17–20 April 2019.

## 2018

10. “Less is More: Degrees of Compositionality for Complex Signals”  
**Philosophy of Science Association**  
Seattle, USA, 1–4 November 2018. *Symposium Contribution.*

9. “Reference by Proxy and Truth-in-a-Model”  
**Western Canadian Philosophical Association**  
Calgary, Canada, 26–28 October 2018.

8. “On The Role of Power in the Evolution of Inequitable Norms” (w/Cailin O’Connor)  
**L’Association Canadienne de Philosophie**  
Montréal, Québec, 4–7 June 2018.

7. “On The Role of Power in the Evolution of Inequitable Norms” (w/Cailin O’Connor)  
**Latin American Association for Analytic Philosophy, and**  
**Colombian Conference on Logic, Epistemology, and Philosophy of Science**  
Villa de Leyva, Colombia, 16–18 May 2018.

6. “On The Role of Information in the Evolution of Signaling”  
**University of Calgary Graduate Philosophy Conference**  
Calgary, Canada, 3–4 May 2018.

## 2017

5. “On Salience and Signaling in Sender-Receiver Games”  
**Western Canadian Philosophical Association**  
Regina, Canada, 13–15 October 2017.

4. “Evolving Salience in Sender-Receiver Games”  
**Luce Graduate Student Conference**  
Irvine, USA, 2 June 2017.

## 2016

3. “Signaling Games & Their Models”  
**Colombian Conference on Logic, Epistemology, & Philosophy of Science**  
Bogotá, Colombia, 17–19 February 2016.

## 2015

2. “Fractionally Quantified Predicate Logic”  
**Logic, Math and Physics Graduate Student Conference**  
London, Canada, 4–5 June 2015.

## 2014

1. “The Metaphysics of Philosophical Objects and their Methodological Implications”  
**Canadian Undergraduate Philosophy Conference**  
Calgary, Canada, 7–9 February 2014.

### Departmental Talks

5. “Less is More: Degrees of Compositionality for Complex Signals”, Interdisciplinary Workshop Series, Department of Philosophy, McGill University, 23 October 2018.
4. “Power By Association” IMBS Friday Seminar, Institute for Mathematical Behavioral Sciences, University of California, Irvine, 27 April 2018.
3. “On Salience and Signaling in Sender-Receiver Games” Social Dynamics Seminar (Fall 2017), Department of Logic and Philosophy of Science, University of California, Irvine, 2 October 2017.
2. “On Signaling Games and Their Models” Social Dynamics Seminar (Fall 2016), Department of Logic and Philosophy of Science, University of California, Irvine, 22 November 2016.
1. “A Prélude to Fractional Quantification” Simon Fraser University Philosophy Graduate Student Colloquium, Simon Fraser University, Burnaby, 7 November 2014.

### Commentor

3. “A Pragmatic-Semiotic Defence of Bivalent Logic” CPA/ACP 2019 Annual Congress, University of British Columbia, Vancouver, Canada, 1–4 June 2019.
2. “Responsibility for Saying and Asserting” (Henry Schiller) CPA/ACP 2018 Annual Congress, Université du Québec à Montréal, Montréal, Canada, 4–7 June 2018.
1. “Simplicity and A Priori Probability Principles” (Noa Latham) CPA/ACP 2018 Annual Congress, Université du Québec à Montréal, Montréal, Canada, 4–7 June 2018.

### ACADEMIC EXPERIENCE

#### Teaching Assistant

*University of California, Irvine*

Inductive Logic, Simon Huttegger Department of Logic and Philosophy of Science (31) Department of Philosophy (31)	Spring 2018
Introduction to Linguistics, Arunima Choudhury Department of Linguistics (3)	Winter 2018
Acquisition of Language, Lisa Pearl Department of Linguistics (51) Department of Cognitive Sciences (56)	Fall 2017
Inductive Logic, Simon Huttegger Department of Logic and Philosophy of Science (31) Department of Philosophy (31)	Spring 2017
Probability and Statistics for Economics I, Kent Johnson Department of Economics (15A)	Winter 2017

### *Simon Fraser University*

Critical Thinking (PHIL xx1), Jillian McIntosh	Spring 2016
Critical Thinking (PHIL xx1), Jillian McIntosh	Fall 2015
Critical Thinking (PHIL xx1), Jillian McIntosh	Spring 2015
Introduction to Ethics (PHIL 120W), Evan Tiffany	Fall 2014

### **Guest Lectures**

#### *University of California, Irvine*

“Language and Cognition” *Acquisition of Language* (Linguistics/Psychology), 1 Dec. 2017.

### **Research Assistant**

#### *University of California, Irvine*

Social Dynamics and Diversity in Epistemic Communities Cailin O’Connor (NSF Grant 1535139)	Spring 2019
Social Dynamics and Diversity in Epistemic Communities Cailin O’Connor (NSF Grant 1535139)	Fall 2018
Social Dynamics and Diversity in Epistemic Communities Cailin O’Connor (NSF Grant 1535139)	Summer 2018
Social Dynamics and Diversity in Epistemic Communities Cailin O’Connor (NSF Grant 1535139)	Summer 2017

#### *Simon Fraser University*

Constructing Questions for Critical Thinking Jillian McIntosh	Spring 2015
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#### *University of British Columbia*

Aristotle’s Earlier Logic John Woods	Summer 2014
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### **GRANTS AND FELLOWSHIPS**

### **Research Awards**

*Social Sciences and Humanities Research Council of Canada* Joseph-Armand Bombardier Canada Graduate Scholarships, Simon Fraser University (\$17,500 CAD), 2015-2016

*Social Sciences and Humanities Research Council of Canada* Joseph-Armand Bombardier Canada Graduate Scholarships, University of British Columbia (\$17,500 CAD), DECLINED, 2014-2015

### **Academic Awards**

#### *University of California, Irvine*

Justine Lambert Graduate Prize in the Foundations of Science, for “On Saliency and Signaling: Partial Pooling, Learning, and Focal Points”, University of California, Irvine (\$1000 USD), 2018.

Social Science Merit Fellowship (\$257,818 USD), 2016–2022

*Simon Fraser University*

Graduate Fellowship (\$6250 CAD), 2015

*University of British Columbia*

John Alexander Scholarship in Humanities (\$1500 CAD), 2014

Robert and Kazuko Barker Award (\$225 CAD), 2014

## PROFESSIONAL SERVICE

**Symposium Organizer** “Evolutionary Explanations of Compositional Communication” Philosophy of Science Association 2018 Biennial Meeting, November, 2018.

**Chair** The Vancouver Summer Philosophy Conference (19–23 August 2018, Vancouver, CAN); F-SEW: Formal Social Epistemology Workshop (25–26 May 2018, Irvine, USA); The Western Canadian Philosophical Association 54th Annual Meeting (13–15 October 2017, Regina, CAN); The Ninetieth Annual Meeting of the American Philosophical Association, Pacific Division (30 March – 3 April 2016, San Francisco, USA).

**Graduate Student Representative** Department of Philosophy, Graduate Student Society, Simon Fraser University, 2015–2016.

**Editor-In-Chief** *hemlock. Undergraduate Philosophy Journal*, 2013–2014.

## SPECIALIZED TRAINING

*University of California, Irvine*

Sex Offense Prevention Training	Fall 2017
Teaching Assistant Professional Development Program	Fall 2016

*Simon Fraser University*

TA/TM Day: Teaching Orientation Program	Spring 2016
TA/TM Day: Teaching Orientation Program	Fall 2015
TA/TM Day: Teaching Orientation Program	Spring 2015
TA/TM Day: Teaching Orientation Program	Fall 2014

*University of British Columbia*

Student Directed Seminar, Training Workshop	Fall 2012
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## LANGUAGES

English (native), French (intermediate)

## TECHNICAL CAPACITIES

*Mathematics:*

Ordinary / Partial Differential Equations, Linear Algebra, Multivariate / Vector Calculus

*Logic:*

Set Theory, Modal Logic, Predicate Logic

*Programming Languages:*

Python, Java, Javascript

*Markup:*

L<sup>A</sup>T<sub>E</sub>X, HTML, CSS

*Computation and Graphing:*

R, MatLab, Excel

AFFILIATIONS

Canadian Philosophical Association  
Philosophy of Science Association  
American Philosophical Association  
Society for Exact Philosophy

REFERENCES

✧ *Dissertation Committee* ✧

**Dr. Jeffrey A. Barrett**

*Chancellor's Professor*

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**Dr. Brian Skyrms**

*Distinguished Professor*

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**Dr. Simon Huttegger**

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**Dr. Cailin O'Connor**

*Associate Professor*

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✧ *External References* ✧

**Dr. Joshua Armstrong**

*Assistant Professor*

350 Dodd Hall  
Department of Philosophy  
University of California, Los Angeles  
Los Angeles, CA, 90095-1451, USA

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**Dr. Nicolas Fillion**

*Assistant Professor*

WMC 4614  
Department of Philosophy  
Simon Fraser University  
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**Dr. Holly Andersen**

*Associate Professor*

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Department of Philosophy  
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**Dr. Christopher Mole**

*Associate Professor*

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Department of Philosophy  
The University of British Columbia  
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SEMINARS AND GRADUATE COURSEWORK	(† = Directed Study, * = Audit)				
<i>Epistemology &amp; Philosophy of Language</i>	Bayesian Epistemology	S. Huttegger	UCI	2018	
	Information Theory	C. O'Connor	UCI	2017	
	Metasemantics	O. Simchen	UBC	2015	
	Language at the Interface	A. Atkins	SFU	2015	
	Recent Perspectives on the <i>A Priori</i> *	P. Hanson	SFU	2015	
	Errors of Reasoning	J. Woods	UBC	2014	
<i>Decision &amp; Game Theory</i>	Social Dynamics	B. Skyrms	UCI	2016-18	
	Evolution and Learning in Games	J. Carvalho	UCI	2017	
	Evolutionary Game Theory	S. Huttegger	UCI	2016	
	Decision Theory and Game Theory	N. Fillion	SFU	2014	
<i>Natural &amp; Aritifical Intelligence</i>	Adv. Topics in Computing Systems*	D. Precup	McGill	2019	
	Fundamentals of Machine Learning*	I. Mitliagkas	UdeM	2018	
	Deep Learning†		UCI	2018	
	Reinforcement Learning	R. Dechter	UCI	2018	
	Intro to Artificial Intelligence	K. Kask	UCI	2017	
	Conscious Systems	K. Saberi	UCI	2017	
<i>Logic &amp; Philosophy of Logic</i>	Undecidability and Incompleteness	K. Johnson	UCI	2017	
	Metalogic	K. Wehmeier	UCI	2017	
	Set Theory	S. Walsh	UCI	2016	
	Modal Logic	S. Walsh	UCI	2016	
	Hypergraphs and Philosophy	R. Jennings	SFU	2014	
<i>Mathematics &amp; Philosophy of Mathematics</i>	Mathematical & Computational Bio	G. A. E. Ruiz	UCI	2017	
	Philosophy of Set Theory	P. Maddy	UCI	2016	
	History of Analysis	T. Archibald	SFU	2016	
<i>History of Philosophy</i>	Frege, Russell, Wittgenstein	J. Heis	UCI	2017	
	Hume's Treatise	K. Schafer	UCI	2017	
	Leibniz and Berkeley*	D. Heide	SFU	2016	
	Descartes	L. Shapiro	SFU	2015	
<i>Ethics</i>	Direction of Moral Duties	A. Zylberman	SFU	2016	
	Responsibility & Excuse	E. Tiffany	SFU	2015	
	Pro-Seminar	E. Tiffany	SFU	2014	
<i>Professional Training</i>	Professional Development	D. Pritchard	UCI	2019	
	University Teaching	M. McBride	UCI	2018	
	University Teaching	M. McBride	UCI	2017	

Last updated: April 20, 2019

SELECTED COURSE <sup>1</sup>  
EVALUATIONS

7- Among Best  
4- OK  
1- Among Worst

Introduction to Inductive Logic, Spring, 2018; $n = 22$	MEAN	St. Dev.	MEAN (All S.S. Courses)
TA was competent in course material	6.55	0.66	5.91
TA was able to make presentations clearly	6.48	0.73	5.85
TA was responsive to students	6.45	0.72	5.97
TA was able to integrate the lecture and discussion material	6.50	0.72	5.94
TA was present and on time for discussion sections and office hours	6.64	0.57	6.09
The discussion sections were useful to the success of the course	6.36	1.02	5.81
I would expect another course with this TA to be	6.64	0.57	5.84
<b>General teaching effectiveness</b>	<b>6.50</b>	<b>0.84</b>	<b>5.63</b>

Introduction to Linguistics, Winter, 2018; $n = 75$	MEAN	St. Dev.	MEAN (All S.S. Courses)
TA was competent in course material	5.84	1.14	5.83
TA was able to make presentations clearly	5.87	1.10	5.78
TA was responsive to students	5.93	1.14	5.94
TA was able to integrate the lecture and discussion material	5.95	1.15	5.89
TA was present and on time for discussion sections and office hours	6.07	1.11	6.11
The discussion sections were useful to the success of the course	5.74	1.36	5.74
I would expect another course with this TA to be	5.85	1.24	5.78
<b>General teaching effectiveness</b>	<b>5.78</b>	<b>1.11</b>	<b>5.60</b>

Acquisition of Language, Fall, 2017; $n = 35$	MEAN	St. Dev.	MEAN (All S.S. Courses)
TA was competent in course material	5.60	1.57	5.72
TA was able to make presentations clearly	5.83	1.52	5.65
TA was responsive to students	5.66	1.57	5.83
TA was able to integrate the lecture and discussion material	5.45	1.63	5.77
TA was present and on time for discussion sections and office hours	5.50	1.61	5.98
I would expect another course with this TA to be	5.60	1.55	5.65
<b>General teaching effectiveness</b>	<b>5.47</b>	<b>1.45</b>	<b>5.52</b>

Introduction to Inductive Logic, Spring, 2017; $n = 26$	MEAN	St. Dev.	MEAN (All S.S. Courses)
TA was competent in course material	6.19	1.44	5.86
TA was able to make presentations clearly	5.88	1.55	5.79
TA was responsive to students	6.16	1.46	5.93
TA was able to integrate the lecture and discussion material	6.08	1.47	5.89
TA was present and on time for discussion sections and office hours	6.26	1.45	6.06
The discussion sections were useful to the success of the course	5.87	1.75	5.74
I would expect another course with this TA to be	6.00	1.56	5.77
<b>General teaching effectiveness</b>	<b>5.93</b>	<b>1.21</b>	<b>5.63</b>

<sup>1</sup>Full course evaluations available upon request

DISSERTATION  
ABSTRACT

Communication is found everywhere in nature; however, language is often taken to be unique to humans. Two questions immediately arise: *What fundamentally distinguishes language from simple systems of communication?* *How did language evolve?* My dissertation suggests answers to these questions by providing a novel way of understanding the evolution of complex communicative dispositions. I show how simple communication systems themselves might compose to create more complex systems. This view prioritises the *reflexivity* of language as the correct explanatory target for bridging the gap between ubiquitous animal communication and distinctively human language.

This challenges the dominant view concerning the evolution of language, which attempts to resolve this explanatory gap by demonstrating how complex syntax evolved. One key difference between communication and language that researchers often point to is the *generative capacity* of languages: with a finite vocabulary and a finite set of grammatical rules, natural languages allow for the production of an unlimited number of novel expressions. This is often referred to as the *Principle of Compositionality*: the meaning of a complex expression is a function of the meanings of its parts and the ways in which they are combined. Simple communication systems that arise in nature lack this unbounded character.

I argue that this focus on syntax is misplaced. On the one hand, such accounts fail to maintain sensitivity to empirical data regarding evolutionary precursors—insofar as genuinely compositional syntax is rare or nonexistent in nature. On the other hand, a system of communication is either compositional or it is not—I argue that there is no room for so-called *protocompositionality*, so these explanations run a foul of the gradualist assumptions in which they are couched.

In contrast, my account prioritises the reflexivity of natural language—the ability to use language to talk about language—as an alternative explanatory target, since this also constitutes a fundamental difference between language and communication. Furthermore, reflexivity has salient precursors in simple communication systems, so it can account for empirical data; it offers a genuinely gradualist perspective; and it is able to give rise to hierarchical compositional structures. Thus, complex syntax is a *byproduct*, rather than a target, on my view.

I argue that what drives the emergence of complex communication systems is a process of *modular composition*, whereby independently evolved communicative dispositions combine to create more complex dispositions. This process of modular composition depends on reflexivity. Once some complexity is exhibited, at a small scale, it may lead to a ‘feedback loop’ between communication and cognition that gives rise to the complexity we see in natural language. This further serves to connect parallel research in the evolution of language and cognitive systems.