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Applied Category Theory <act2019school@gmail.com>

LOR - Ross Griebenow
1 message

Dawer Jamshed <dawerj@vertexlabs.info>   Tue, Jan 29, 2019 at 3:47 PM
To: act2019school@gmail.com

Let me begin this letter of recommendation by stating that I give Ross the highest possible recommendation and urge you to consider him for your program.

One year ago, I was quite puzzled when a young man named Ross Griebenow interviewed as a Jr. Researcher with my deep learning group himself knowing nothing about machine learning at all! Within the course of the interview, we were able to reach complex discussions regarding sampling the error surface, distribution of local minima, and analyzing both theoretically and in an applied way the interplay of optimizers on different error surfaces resulting from different loss functions and using these results to achieve better convergence. Needless to say, he got the job.

His stay with our group saw him surpassing the level of many of our younger PhDs both theoretically and in the applied setting yet he remained humble throughout and always a great pleasure to work (and debate) with. There have been times when his applied experiments with finding the max clique of a graph led me to introduce him to my esteemed colleague Igor Rivin where we spent hours discussing Ross's excellent work and possible meanings and steps forward. It is rare to see such talent.

In our recent discussions at our book club, I have noted he has become deeply interested in category theory. He has ended up being a leading figure in our discussions on casual structure and computability in graphs. I think a category theory track blends perfectly with his love for so many diverse subjects (especially computability) and his capabilities in mathematical theory and philosophy. I look forward eagerly to see where his career takes him and what new ways of thinking he brings to our communities.

Sincerely,
Dawer Jamshed
Chief Scientific Officer,
Vertex Labs
Thank you

Dawer

Dawer Jamshed
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Ross Griebenow

Applied Category Theory School 2019

24 January 2019

Background: I have a working understanding of the basic concepts of category theory and I'm currently working through the Fong/Spivak book. I have a very strong understanding of traditional computability and complexity theory, which could be valuable for the Turing categories project. I am also very interested in complex/emergent systems and I'm familiar with the broad range of topics related to this study, many of which intersect with the topic of autopoiesis and self-organization (in particular, I think information theory has a lot to offer). My proficiency in programming and familiarity with modern deep learning and NLP could be helpful for Mehrnoosh Sadrzadeh's project.

Ph.D: While I hope to complete a Ph.D in Mathematics in the future, I don't yet have any idea when or where it will be or what it will entail. I will complete my undergraduate degree this spring.

Ross Griebenow
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Education

Drexel University	Philadelphia, PA
College of Computing & Informatics	Anticipated Graduation: Spring 2019
B.S. in Computer Science	3.5 Cumulative GPA
Minor in Mathematics	

Skills

- Languages: Python (NumPy, TensorFlow, Keras), C/C++, Java, Matlab, Maple
- Concentrations: Information Theory, Spectral Graph Theory, Machine Learning, Algorithms

Technical Project

Citeomatic Citation Recommendation System   2018-
Lead Developer
- Implemented a state-of-the-art deep learning/natural language processing system for citation recommendation
- Communicated with stakeholders at Drexel University & Allen Institute for AI
- Shared technical knowledge & guided less experienced team members

Work Experience

Vertex Laboratories   2018-
Junior Researcher
- Learned new concepts and performed literature reviews independently
- Participated in applied machine learning research
- Executed client projects autonomously

Clearwater Research   2015
Data Collection Interviewer
- Gathered scientifically accurate data verbally from survey respondents while performing data entry
- Responded to weekly supervisor feedback to improve performance
- Worked autonomously for long periods of time with minimal supervision

Relevant Coursework

- Abstract Algebra
- Real Analysis
- Linear Algebra
- Probability & Statistics
- Differential Equations
- Numerical Analysis
- Theory of Computation
- Data Structures & Algorithms
- Artificial Intelligence
- Symbolic Computation
- Software Design
- Neuropsychology

Honors & Awards

3rd Place- Agent Design, Santa Fe Institute Spring Complexity Challenge	2018
National Merit Finalist Scholarship	2015-2019

Hello,

I am interested in participating in the ACT2019 school.

In descending order, my preferred projects are:

Complexity classes, computation, and Turing categories
Toward a mathematical foundation for autopoiesis
Formal and experimental methods to reason about dialogue and discourse using cat
egorical models of vector spaces
Traversal optics and profunctors
Partial evaluations, the bar construction, and second-order stochastic dominance
Simplifying quantum circuits using the ZX-calculus

While my undergrad is in computer science, I've become more interested in a wide
 range of mathematical topics, both for their intrinsic beauty, and because "pur
e" math seems to have so much under-appreciated potential for application in fie
lds like AI and complex systems. I've always seen myself as interdisciplinary; t
he one thread that runs through everything I've ever been interested in is the c
ombination of disparate ideas, and category theory is uniquely suited to this ki
nd of approach. I intend to pursue a Ph.D in Mathematics, and so any opportunity
 to participate in learning and research with talented and experienced people in
 a mathematical topic that interests me is invaluable.

Additionally, one of my biggest interests is in understanding computation in a v
ery broad sense (thought as computation, economics as computation, physics as co
mputation, ecology as computation, biology as computation...) and looking for f
ormalisms that are able to capture the commonalities and differences of the prop
erties of these systems from this perspective. I believe that this approach coul
d yield insight into some of the hardest problems in science such as artificial
intelligence and emergence. Such an ambitious project would involve uniting- amo
ng other things- traditional computability and recursion theory, information the
ory, statistical physics, and the machinery of pure mathematics, and for this re
ason, category theory is an indispensable tool. A lot of really beautiful work h
as been done in this vein by people like David Wolpert and John Baez, but there'
s no single unified framework. I'm aware of no better tool for uniting different
 conceptions of computation than category theory. Indeed, Pieter Hofstra's proje
ct for the school is a step towards addressing this!

I'm reasonably certain I would be able to come to Oxford; I should be able to pa
y my way if need be.
Attached is my resume and a note about my background.

Thanks,

Ross Griebenow