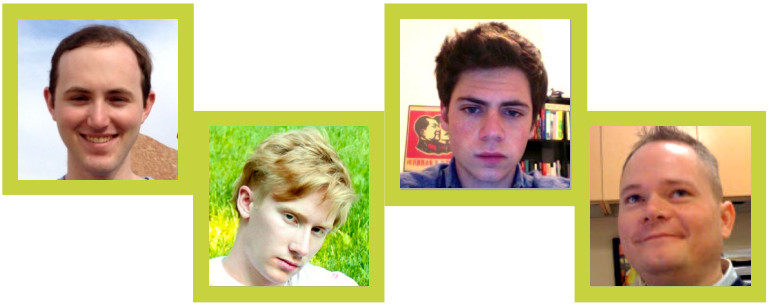
Logic and the Methodology of Science

Fall 2013 Volume 2



Incoming Class 2013

Four new Ph.D. students are joining the ranks of the Logic Group. Pictured from left to right, they are:
Daniel Fremont (MIT, logic and computer science), James Moody, (NYU, model theory and geometry), Nick Ramsey (Chicago, model theory), and Chase Skipper (Hunter College, CUNY, large cardinals and inner model theory). Please welcome the largest new cohort since 2006!

Farewell!

We have four departing students, pictured from left to right: Ian Herbert attained his Ph.D. with a thesis entitled “Weak Lowness Notions for Kolmogorov Complexity”, and is now a Research Fellow at the National University of Singapore. Justin Bledin is now Assistant Professor of Philosophy at Johns Hopkins, having completed his Ph.D. thesis entitled “Logic Informed”. Sridhar Ramesh obtained his M.A. degree and has accepted a position at Google Inc. Gwyneth Harrison-Shermoen is finishing up her Ph.D. thesis, titled “Independence Relations in Theories with the Tree Property”. Detailed descriptions of Ian, Justin and Gwyneth’s research can be found in last year’s issue of this newsletter.

Buenos Aires Semester in Computability, Complexity and Randomness

A large contingent of Berkeley logicians, led by Professors Ted Slaman and Antonio Montalbán spent the Spring 2013 semester in Argentina, attending a novel congregation of researchers of various stripes. The blend of seminars, courses, collaboration, sightseeing and not having to get haircuts led to a very productive term, by all accounts.

Participants also included postdocs Adam Day and Damir Dzhafarov; students Kelty Allen, Ian Herbert, Ian Haken, Greg Igusa and Linda Westrick; and visitor Mariya Soskova. Photo credit: CePro - Exactas

If you would like to receive announcements about the bi-weekly Logic Colloquium and the annual Tarski Lectures, please contact John Addison at addison@math.berkeley.edu

If you would like to receive announcements about other logic events in the bay area, please contact Ethan Jerzak at jerzak@berkeley.edu to be added to the BayLog listserv.

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Logical Axioms

Lawrence Valby is working on his PhD thesis with Professors Tom Scanlon and Seth Yalcin. One problem he's been thinking about recently involves axiomatizing a certain concrete class of idempotent semigroups arising naturally from a notion of conversation update system where you're allowed to both subtract and add possibilities under consideration. Another problem he's mulled over involves axiomatizing the algebra of relations whose operations are given by positive existential formulas without equality.

Logical Randomness

Kelty Allen is working on her PhD in recursion theory under the supervision of Ted Slaman. She uses ideas from algorithmic randomness to study Brownian motion, which can be thought of as the random elements of a function space with respect to Wiener measure, and is an active area of research in probability theory. She focuses on Martin-Löf random Brownian motion, and aims both to gain deeper insight into classical results about Brownian motion, and to prove new recursion-theoretic results.

This year, Kelty has been awarded a UC Dissertation Fellowship. Congratulations, Kelty!

Book update

Professor Lara Buchak's book, *Risk and Rationality*, presenting her account of the principles governing rational decision-making in the face of risk, will be published by Oxford University Press in January 2014.

Logical Decisions

Arthur Tilley works in the intersection of model theory, decision theory, and reliability theory. His advisor is Professor Thomas Scanlon. Arthur's research involves extending current work regarding the probability of a jury coming to the correct verdict on a given binary choice decision. In particular he examines situations where the jurors are allowed to deliberate amongst themselves making their individual competence levels non-independent probabilities.

Arthur is not certain what he will do upon graduation, but he is looking forward to venturing beyond academia.

PROBLEM:

A Robbins algebra consists of an associative, commutative binary operator $\vee$ and a unary operator $\neg$ satisfying Robbins equation $\neg(\neg(a\vee b)\vee\neg(a\vee\neg b))=a$. Is every Robbins algebra also a Boolean algebra? (*Answer on p.4.*)

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Antonio Montalbán

Antonio Montalbán arrived in the math department as Associate Professor in 2012, and has recently joined the Logic Group faculty. His research is concerned with the complexity of the objects of mathematical practice such as proofs, structures, and constructions, drawing on techniques from computability theory and reverse mathematics. Montalbán describes his motivations as twofold: First, there is the foundational quest to understand what assumptions are actually needed in practice, as ZFC is usually far too strong. Second, from a computational viewpoint, he would like to know which parts of and to what extent mathematical practice can be done by mechanical algorithms. As a bonus, Montalbán finds that sometimes such meta-analyses end up telling us more about the original objects themselves!

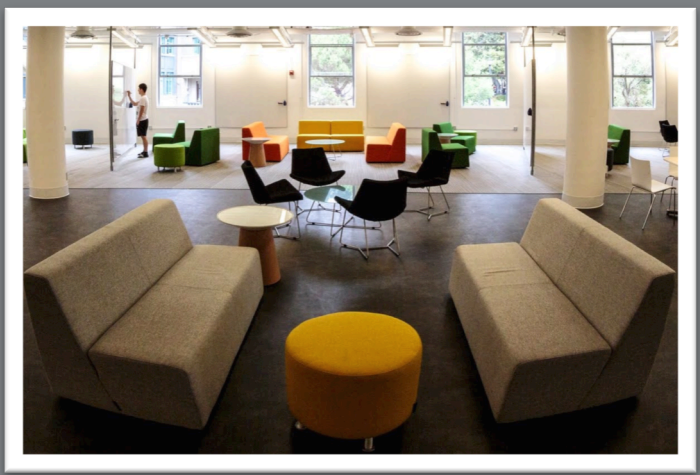
Simons Institute's Calvin Lab Opens

The home of the newly founded Simons Institute for the Theory of Computing, Calvin Lab, has been renovated and will be open in time to host its first two scientific programs this term, "Real Analysis in Computer Science" and "Theoretical Foundations of Big Data Analysis". The renovations by San Francisco's Studios Architecture include a large reception and gathering area on the first floor, two interaction areas on the upper floors, and a new 110-seat auditorium. The character of the original lab, preserved by the renovations, is one of open interaction and collaboration. Calvin Lab is located behind (east of) Wurster Hall and beside (south of) the Haas complex: come take a look!

Wes Holliday

Wes Holliday, who joined the Logic Group faculty this year, is an assistant professor of philosophy working on epistemology, logic, and the intersection thereof. His current research in logic focuses on epistemic logic, an area of modal logic developed by philosophers, theoretical computer scientists, AI researchers, game theorists, and others to represent and reason about knowledge and belief. He has worked on open technical problems in epistemic logic, on applications of epistemic logic in epistemology, and on modal logics with probability operators. Holliday received his PhD under the supervision of Johan van Benthem and Krista Lawlor at Stanford University.

For his thesis, "Knowing what follows: Epistemic Closure and Epistemic Logic", Wes was recently awarded the 2013 E. W. Beth Dissertation Prize from the Association of Logic, Language and Information.



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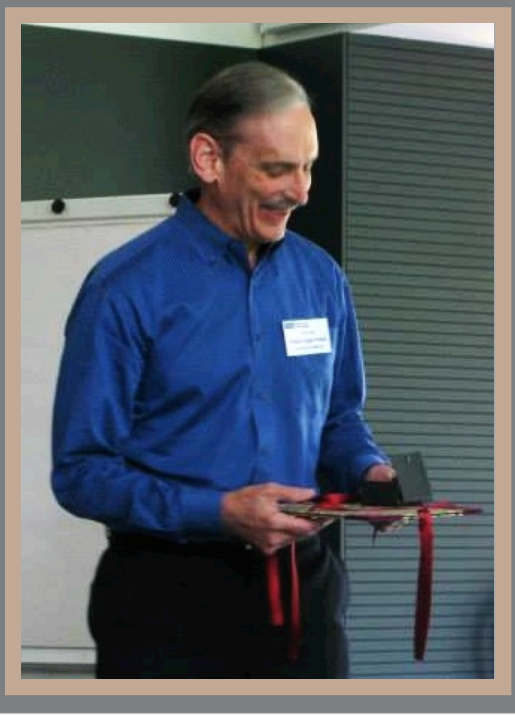

Hugh Woodin wins the inaugural Hausdorff medal

In July 2013, Professor W. Hugh Woodin was awarded the first ever Hausdorff medal, presented by the European Set Theory Society for the “most influential published work in set theory in the last five years”. The work in question was published in two articles, “Suitable extender models I” (J. Math. Log. 10 (2010), no. 1-2, pp.101--339) and “Suitable extender models II:beyond ω-huge ” (J. Math. Log. 11 (2011), no. 2, pp.115--436), where in the words of the President of the Society, “the author made a major contribution to the inner model theory of supercompact cardinals and beyond. This work is innovative, courageous and deep, and no matter what the final solution of this major problem in set theory will look like, it is clear that it will have to depend on the contributions Woodin made in these papers.” Congratulations, Professor Woodin!

We have recently hung portraits of Julia Robinson and Alfred Tarski in the Tarski Room. The photo of Robinson (1919-1985) dates from the early 1980s, and was taken by George Bergmann, who kindly allowed us to print it. The chalk portrait of Alfred Tarski (1901-1985) was drawn in 1936 by the Polish artist Stanislaw Ignacy Witkiewicz. The drawing itself is owned by Alfred Tarski's son, Jan, who kindly gave permission for us to reproduce it. The artist drew a whole series of portraits of leading intellectuals of the time in inter-war Warsaw, but the one of Tarski is said to stand out for its intense expressiveness.

ANSWER

(Answer to problem on p.2.) Yes, the associativity and commutativity of ∨ together with the Robbins equation give an alternative axiomatization for Boolean algebras. However, despite being conjectured by Robbins (of Courant and Robbins fame) in the 1930s and studied by Tarski and his students for decades, this was only proved in 1996 by McCune with the help of an automated theorem prover.