

NA-CAP@IU-2008: The Limits of Computation, July 10-12

Presentations at this year's North American-Computing and Philosophy explored various readings of the deliberately ambiguous conference theme, the limits of computation. Held at Indiana University-Bloomington, the conference brought together interdisciplinary and international research on

- Theoretical and practical limitations on computability with respect to Turing Machine computability and complexity constraints;
- Theoretical and imposed limitations on robot agency, autonomy, and responsibility; and,
- The feasibility of providing computational accounts of special or uniquely human cognitive capacities, including human creativity.

IACAP President and recently elected Gauss Professor Luciano Floridi (Hertfordshire and Oxford) opened the conference on a much broader theme by arguing that we are in the midst of an information revolution. Discovering the fundamentally informational nature of the universe such that matter itself is just another kind of interface, we learn that we are informational organisms, or *inforgs*, inhabiting the *infosphere*.

Giving the Douglas C. Engelbart keynote address, Ronald Arkin (Georgia Tech) made the case that the behavior of live-fire autonomous battlefield robots can and ought morally be limited by the reasonably well-defined rules of warfare and more specific rules of engagement. Arkin closed his provocative talk by outlining current research intended to achieve this end which introduces the notion of an *ethical governor* in robot control. Throughout the talk, Arkin stressed the importance of maintaining clear lines of responsibility to human agents in light of the strong motivation for deploying live-fire autonomous robots.

Paul Thagard (Waterloo) argued during his Herbert A. Simon keynote address that, suitably cast in terms of changes wrought by manipulation, computers can understand causality. Since the title of Thagard's talk, "Can Computers Understand Causality?", invites such responses as "how could they since humans don't?" and "how could they since they don't understand anything, full-stop?", the discussion following the talk was predictably vigorous. NA-CAP President Selmer Bringsjord (Rensselaer Polytechnic) and James Fetzer (Minnesota-Duluth) responded that the epistemic notion of causality in terms of manipulability is a poor substitute for the difficult metaphysical debates over regularist and necessitarian conceptions of causation.

During a special session on Automatic Programming and Human Creativity, Bringsjord argued that the problem of writing programs that write programs is hard, much harder than the halting problem, which helps explain why there has been so little progress in the field over the last thirty years. Martin Frické (Arizona) suggested in discussion that interpreters, compilers, and *Mathematica* are programs that write programs according to high-level specification and, despite the difficulty of the problem, succeed admirably.

Other conference highlights included Anthony Chemero (Franklin and Marshall) and Michael Turvey's (Connecticut and Haskins Lab) use of hyperset theory to argue against Robert Rosen's claim that living (metabolism-repair) systems are not computable; Drew McDermott's (Yale) argument that special features of ethical reasoning make it an extremely difficult, if not intractable, problem for implementation in machine ethics; Darren Abramson's (Dalhousie) intriguing use of computational functionalism in an argument for phenomenal externalism; Fetzer's argument that digital computers, insofar as they cannot *use* signs, are fundamentally algorithmic, and can at most simulate affective states, cannot have thoughts; Matteo Turilli's (Oxford) approach to embedding ethics in the design of software for autonomous machines; and Chin-Chun Chen's (University College London) Goldberg Award winning presentation on agent-based simulations of

emergent phenomena.

Conferees universally applauded host Colin Allen (Indiana) and chair Anthony Beavers' (Evansville) outstanding efforts to ensure high-quality, engaging presentations for lively discussion. Please see <http://www.ia-cap.org/na-cap08/> for additional details about the conference.

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