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Opportunities for Fluid Dynamics Research in the Forensic Discipline of Bloodstain Pattern Analysis DANIEL ATTINGER, Iowa State University, CRAIG MOORE, Niagara Regional Police Service, ADAM DONALDSON, Dalhousie University, ARIAN JAFARI, Iowa State University, HOWARD STONE, Princeton University — This review [Forensic Science International, vol. 231, pp. 375-396, 2013] highlights research opportunities for fluid dynamics (FD) studies related to the forensic discipline of bloodstain pattern analysis (BPA). The need for better integrating FD and BPA is mentioned in a 2009 report by the US National Research Council, entitled "Strengthening Forensic Science in the United States: A Path Forward". BPA aims for practical answers to specific questions of the kind: "How did a bloodletting incident happen?" FD, on the other hand, aims to quantitatively describe the transport of fluids and the related causes, with general equations. BPA typically solves the indirect problem of inspecting stains in a crime scene to infer the most probable bloodletting incident that produced these patterns. FD typically defines the initial and boundary conditions of a fluid system and from there describe how the system evolves in time and space, most often in a deterministic manner. We review four topics in BPA with strong connections to FD: the generation of drops, their flight, their impact and the formation of stains. Future research on these topics would deliver new quantitative tools and methods for BPA, and present new multiphase flow problems for FD.

Daniel Attinger
Iowa State University

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