

National Institute of Justice

Award Title: Paper microfluidic systems for rapid and inexpensive presumptive detection of drugs and explosives

Award Description:

The goal of this proposal is to develop and validate a paper microfluidic device for the presumptive detection of explosives. Paper microfluidics is a transformational technology that permits the development of very inexpensive analytical devices based on designs printed in wax-based ink on chromatography paper. The wax channels in the paper direct the liquid samples toward individual sections of the paper containing colorimetric test reagents. With proper design, a single device can perform five or more simultaneous analyses while costing only pennies, since the basic design components, chromatography paper, wax, and small quantities of reagents, are all very inexpensive. The paper devices are easily stored for long-term performance and because of their low cost could revolutionize on-site forensic testing. In this proposal we seek funds to develop paper microfluidic devices based on colorimetric spot tests for forensic explosives analysis. Colorimetric tests might include Greiss and diphenylamine reagents for organic and inorganic nitrates, p-DMAC for urea nitrate, and ammonium titanate for peroxides and other similar procedures. Once proof-of-concept is confirmed using a variety of colorimetric spot test reagents, we will validate the procedure using tests for sensitivity, pre and post blast residues and potential interferences. Overall, the development of this paper-based sensor will provide police and forensic evidence collection teams an easily-stored and reliable tool for presumptive testing of unknown evidence. Sheets of these paper devices could be easily and cheaply manufactured and take up no more space than a package of cigarette papers. Their low cost and easy portability would mean that every analyst and crime scene response team member could carry a kit capable of instant identification of unknown or hazardous compounds. ca/ncf

Awardee Name: The Florida International University

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Solicitation Title: NIJ FY 12 Applied Research and Development in Forensic Science for Criminal Justice Purposes

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Recovery Act: No

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County: Dade

Congressional District: 25

Award Status: Open