



Apr 16th, 9:00 AM - 10:00 AM

## A New Technique for Imaging Real-Time Cytokine Secretion

Sydney Muchnik  
*Illinois Wesleyan University*

Brian Walter, Faculty Advisor  
*Illinois Wesleyan University*

Ramesh Ramji, Faculty Advisor  
*Yale University*

Kathryn Miller-Jensen, Faculty Advisor  
*Yale University*

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>



Part of the [Biology Commons](#), and the [Education Commons](#)

---

Muchnik, Sydney; Walter, Faculty Advisor, Brian; Ramji, Faculty Advisor, Ramesh; and Miller-Jensen, Faculty Advisor, Kathryn, "A New Technique for Imaging Real-Time Cytokine Secretion" (2016). *John Wesley Powell Student Research Conference*. 12.  
<https://digitalcommons.iwu.edu/jwprc/2016/posters/12>

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact [digitalcommons@iwu.edu](mailto:digitalcommons@iwu.edu).

©Copyright is owned by the author of this document.

Poster Presentation P27

## **A NEW TECHNIQUE FOR IMAGING REAL-TIME CYTOKINE SECRETION**

Sydney Muchnik and Brian Walter<sup>1\*</sup> and Ramesh Ramji<sup>2\*</sup> and Kathryn Miller-Jensen<sup>2\*</sup>

<sup>1</sup>Biology Department, Illinois Wesleyan University

<sup>2</sup>Biomedical Engineering Department, Yale University

The analysis of single cell cytokine secretion has become an area of great interest in research relating to the immune system and disease. Cytokines, the small proteins that cells secrete for signaling, are used to categorize immune cell's responses to disease, drugs, or other stimulation. The most advanced widespread assay for single cell cytokine secretion is the fluorospot assay, a technique that utilizes multiple fluorescent markers to visualize the secretion of two or more cytokines simultaneously. However, this assay only provides data about the percentage of total cells that are secreting cytokines at a fixed time point, because cells must be removed from the plate before imaging. Therefore, our goal is to develop an assay that retains cells individually, allowing for continuous analysis of single cell secretion over a time course. In this work, we use T cells latently infected with a GFP-tagged HIV virus, which allows us to visualize the activation of the virus and cell secretion in response to this activation. In the assay we developed, a microfluidic device containing pillar traps is used to suspend the cells individually. A channel in the device contains the traps, which are coated in a capture antibody. Flowing through a stimulant activates the latent HIV in the cells. Cytokine secretions are visualized using fluorescently tagged antibodies. We have successfully detected IL-2 secretion by individual J Lat 10.6 cells in a fixed-time version of this assay, and are working to perform this technique over a 6 to 18 hour time course. We will utilize this technique to explore the timing of the activation of latent HIV in relation to cytokine secretion, and will use image processing to quantify the secretion of each cell. The technique we are developing will also be applicable in other contexts, as it will ultimately enable identification and quantification of single cell cytokine secretion over a long period of time.

