

# Prof. Dino Di Carlo Seminar

October 3<sup>rd</sup> 1:00-2:00pm

Venue: Conference Room 1<sup>st</sup> floor, Bldg No.1 of LiMe

<https://www.infront.kyoto-u.ac.jp/en/access/>

Prof. Dino DI CARLO

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## Title

**Single-cell Functional Cytometry using Lab on a Particle Technology**

## Abstract

We have developed 3D-shaped hydrogel microparticle platforms as cell-sized test tubes that interface with cells and assay cellular function. These “lab on a particle” systems enable sorting cells based on secreted products for the discovery of antibodies and T-cell receptors. Nanovial particles capture cells and their secretions and are compatible with standard cytometers and single-cell sequencing instruments, linking cell secretory function to transcriptomes for thousands of single cells. I will discuss our latest results linking the transcriptomes of single cells to the secreted products they produce. I will cover a few example applications of secretion encoded single-cell sequencing (SEC-seq) workflows. In a first example we uncover gene networks associated with high secretion of immunoglobulin G in human plasma cells, one of the most highly secreting cell types in the body. In a second application we characterize a unique transcriptionally-defined cluster of mesenchymal stem cells (MSCs) that secrete higher levels of vascular endothelial growth factor A (VEGF-A) and uncover new surface markers that can be used to select these highly secretory cells. VEGF-A is a pro-regenerative growth factor that is thought to drive therapeutic benefit in MSC-based therapeutics. I will summarize the potential for nanovial technology to promote understanding and engineering of functional properties in single cells, and ultimately drive the next-generation of cell therapies.

## Biography

Dino Di Carlo is the Armond and Elena Hairapetian Professor of Bioengineering at UCLA, serial entrepreneur and inventor. He serves in academic leadership roles as the Vice Chair of the Bioengineering Department and Deputy Director of a National Science Foundation Engineering Research Center. He is an author on >170 peer-reviewed articles and an inventor on >70 issued patents in the U.S. and across the world. He has received numerous awards, including the Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed upon young scientists and engineers. He also has served in business leadership roles. He co-founded seven several companies in life science research tools, diagnostics, medical device, and pharmaceutical industries over the last 10 years and continues to serve on the board of directors of many of these companies. He is a co-founder and director at Cytovale, a 70+ person company commercializing an FDA-cleared sepsis diagnostic test for rapid triage in the emergency department. He is Scientific Advisor to several life sciences companies, including Cue Health (NASDAQ:HLTH), which developed the first at-home molecular diagnostic test to be cleared by the FDA.

Zoom:

<https://kyoto-u-edu.zoom.us/j/82389382827?pwd=WTFXM25ZM1FYU0xiSTRsM010K0tBQT09>

Host: Hirofumi Shintaku (shintaku@infront.kyoto-u.ac.jp)