

Introducing the UCSD NIC

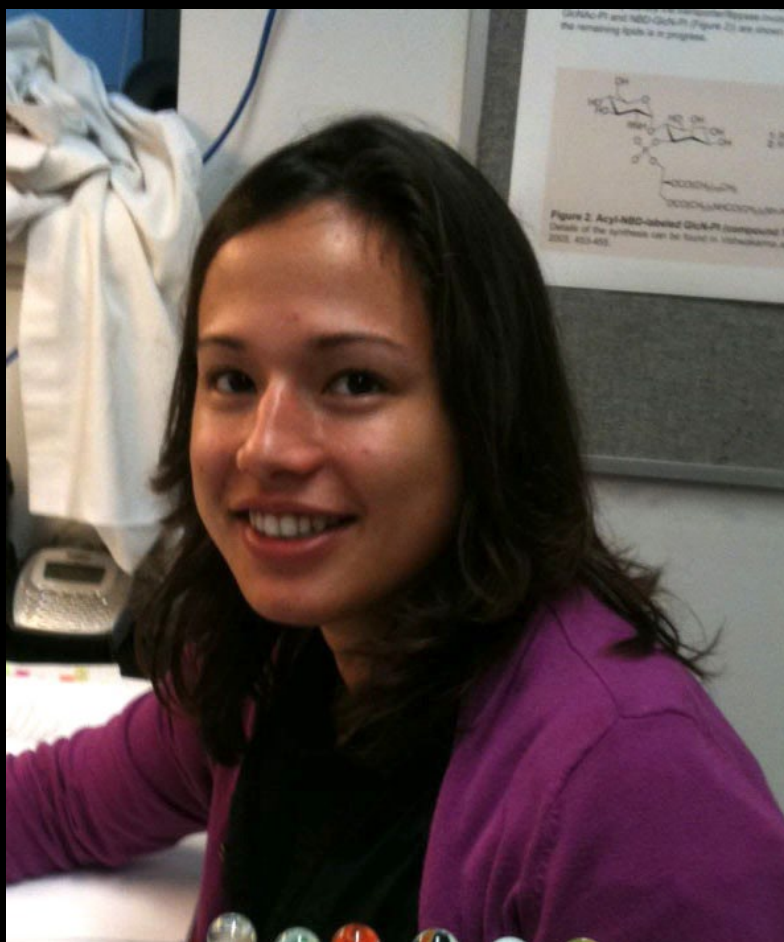
NIKON
IMAGING
CENTER

UC San Diego



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Dr. Daphne Bindels
Assistant

Major Kudos

Sam Reck-Peterson

Nikon Instruments Incorporated

Physics Computing Facility

CMM Administration

Eight Supported Systems

- 2 Point Scanners (A1R and C2)
- 3 Spinning disk confocals (X1, Crest X-Light V2, W1-SoRa)
- 2 Widefields 1 with monochrome and color cameras, 1 in a BSL-3 facility
- 2 TIRF units (1 TIRF/STORM) that are combined with spinning disks
- 1 Mizar Tilt light sheet
- Structured illumination (2D-3D-TIRF) combined with the A1R
- Micropatterning device – Aveole Primo on the C2 system
- Everything is set up for live cell imaging, including a robotic high-content live imaging environment with the CREST X-Light V2
- Three offline workstations

Imaging Priorities

- Geographically, we exist as a core where two neighboring buildings also have cores

Gilman Dr

Gilman Dr

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Gilman Dr

Leichtag Biomedical Research

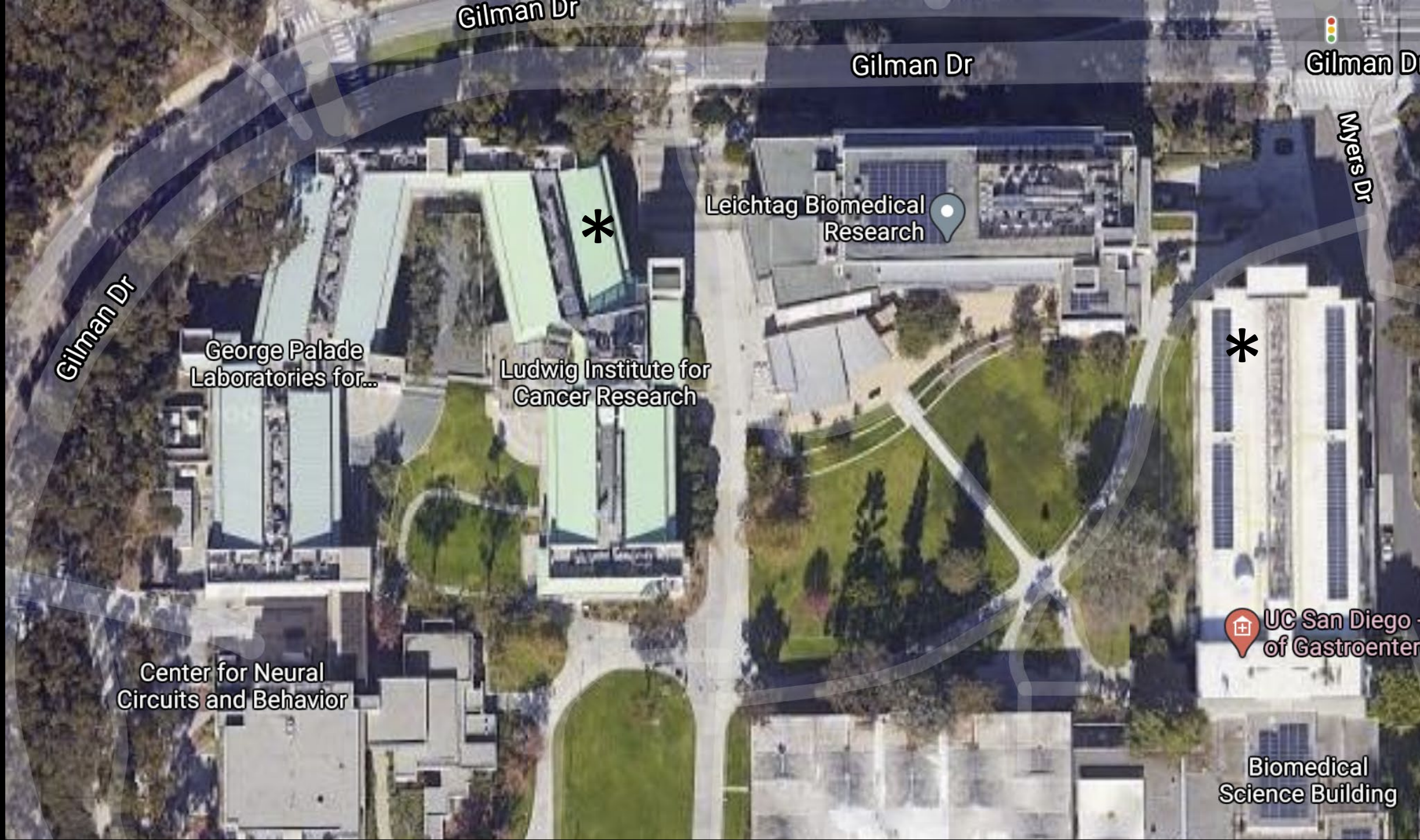
George Palade Laboratories for...

Ludwig Institute for Cancer Research

UC San Diego - of Gastroentero

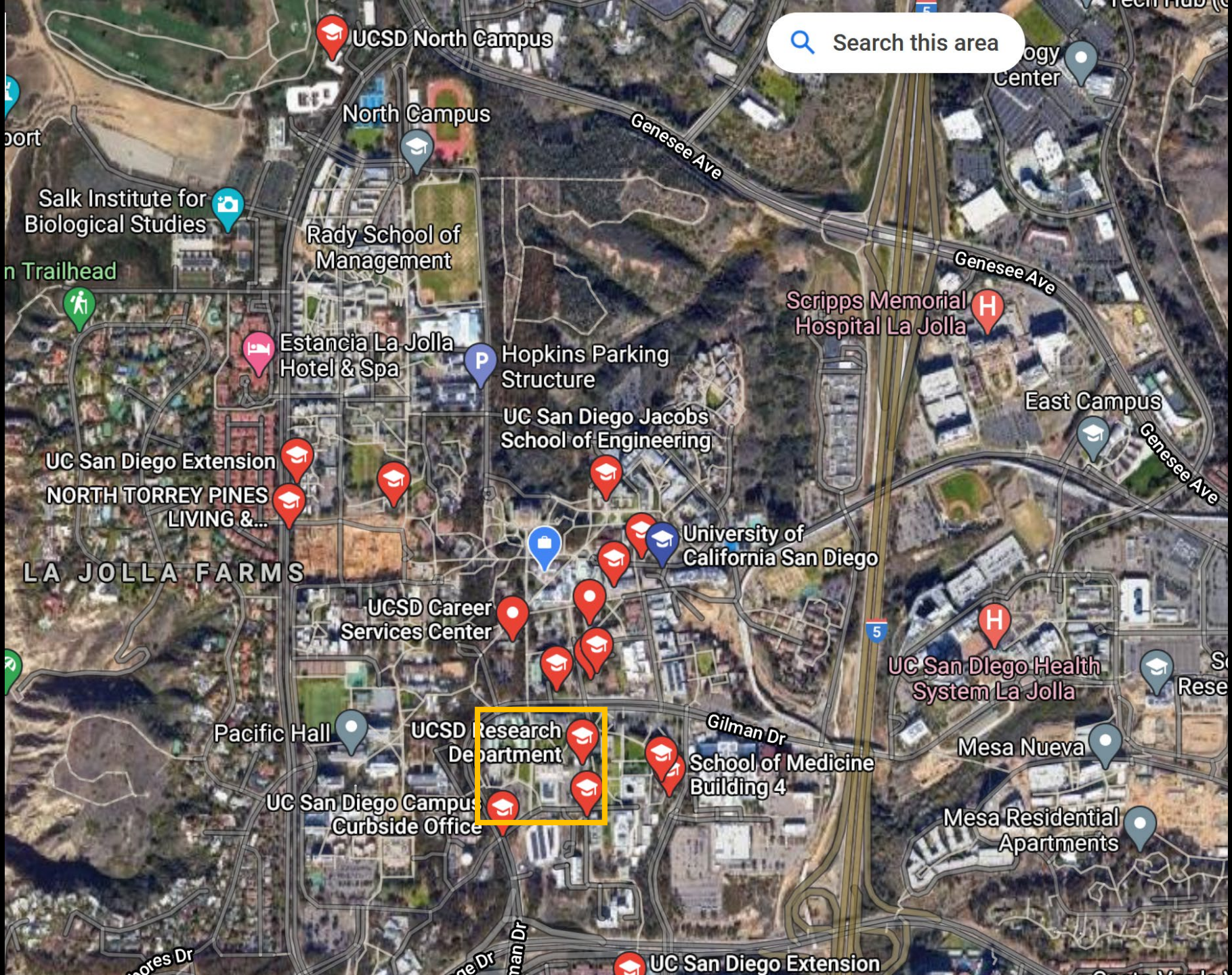
Center for Neural Circuits and Behavior

Biomedical Science Building



Imaging Priorities

- Geographically, we exist as a core where two neighboring buildings also have cores
- We differentiate ourselves by focusing on live-cell imaging
- We focus on automating as many of our workflows as possible
- We're working more with cryo-EM labs by shifting some instruments to the cryo-EM core facility and expanding to the other side of campus



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Imaging Priorities

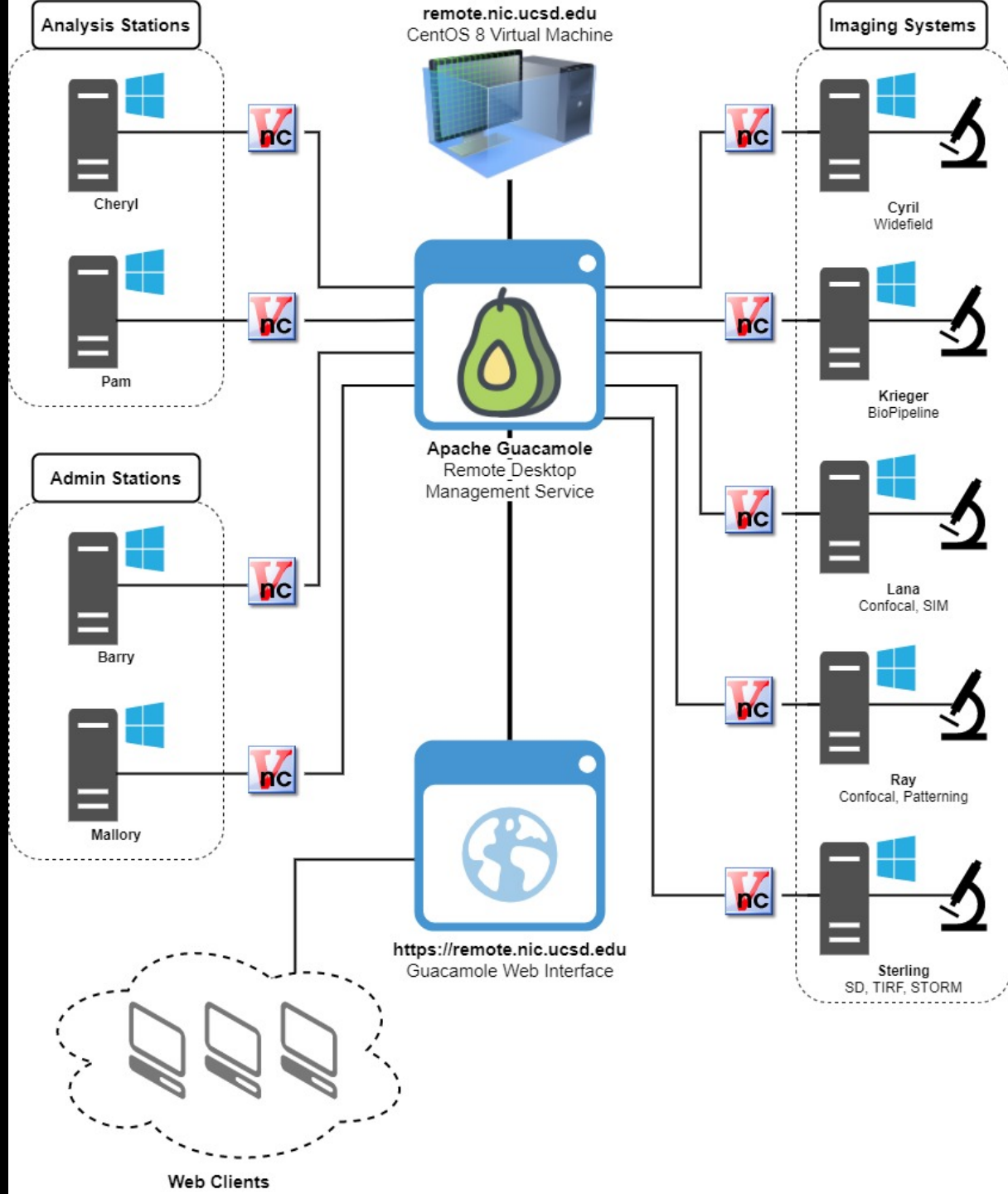
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- We're working more with cryo-EM labs by shifting some instruments to the cryo-EM core facility and expanding to the other side of campus
- In La Jolla we have an abundance of local biotech and pharma, and we work with several of them to either provide access to instrumentation or in a CRO manner

User Management

- We use the campus Active Directory system to control logins to the computers and to organize data storage
- As an AD administrator, I can create user profiles for industry users and the local Nikon team
- AD is also how we manage remote access to the workstations and data storage

Remote Access

- When the pandemic hit, we had to find a solution for users to be able to access our offline workstations for data analysis
- We originally used a commercial solution until they realized we weren't a single non-commercial user
- We're now using Apache Guacamole for remote access



Current Data Storage Solution

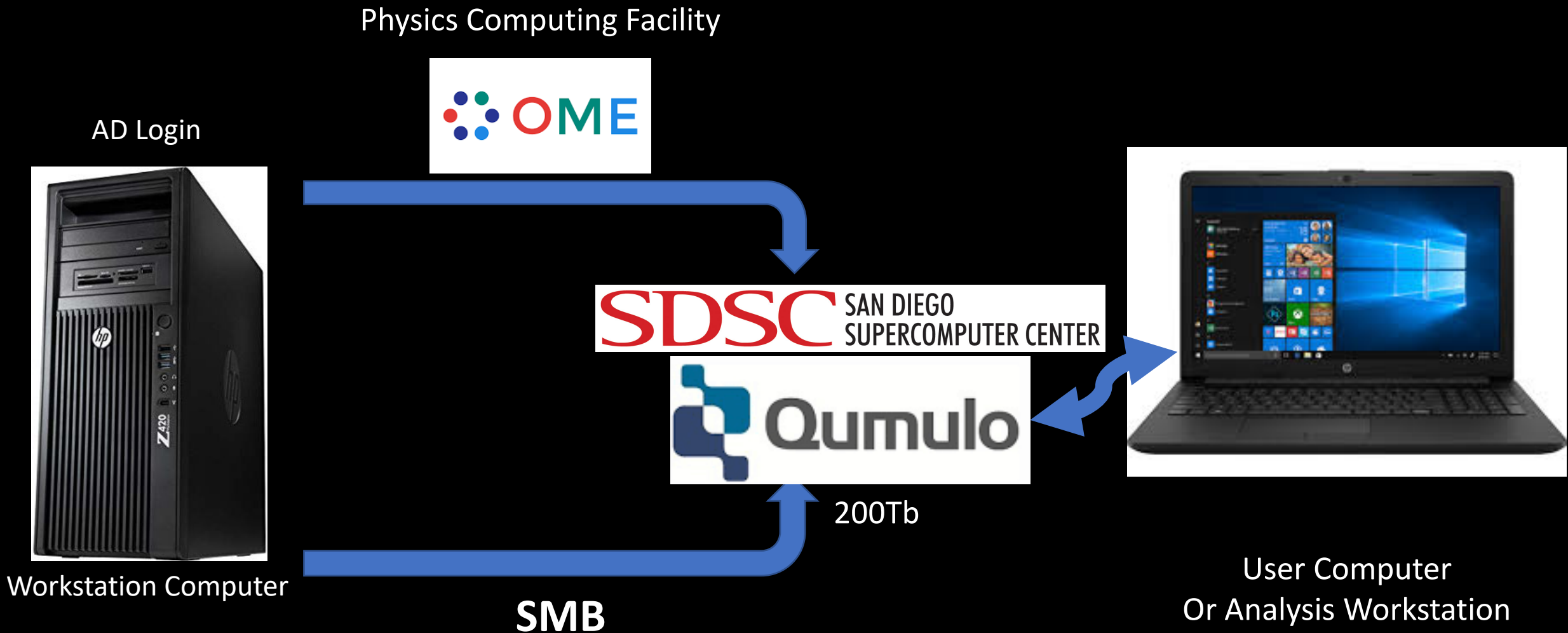
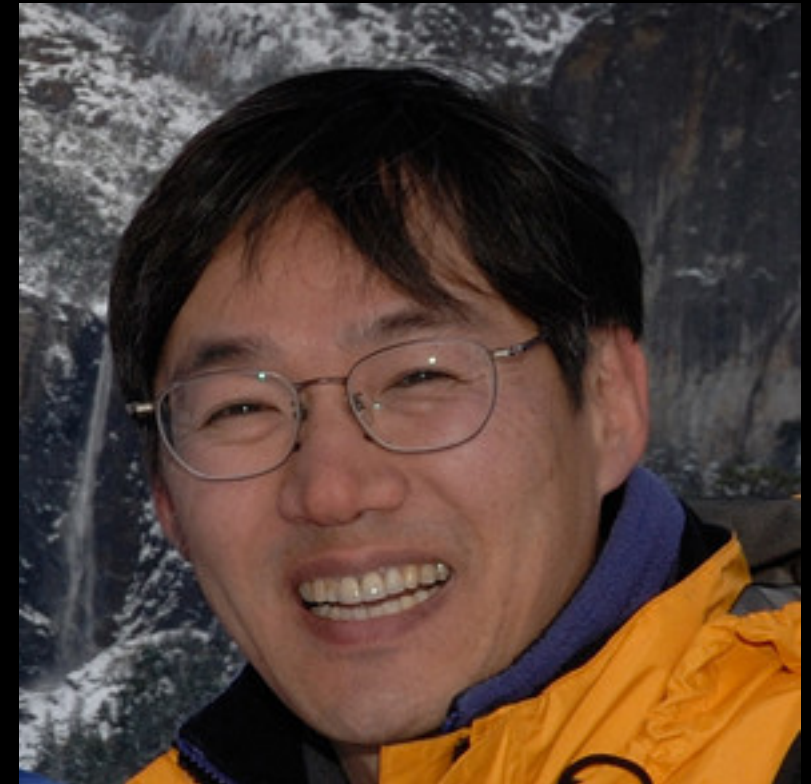


Image Analysis

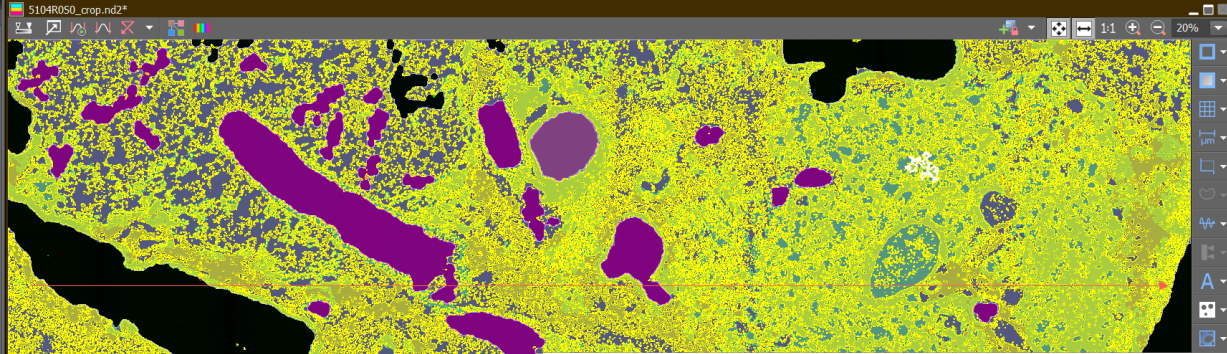
- We had some seed funding from the medical school for an image analysis center and hired someone to work 50% time on this for one year
- We're trying to come up with a permanent solution for supporting this function
- My assistant is now working 25% time to help users with image analysis projects, supported by recharge



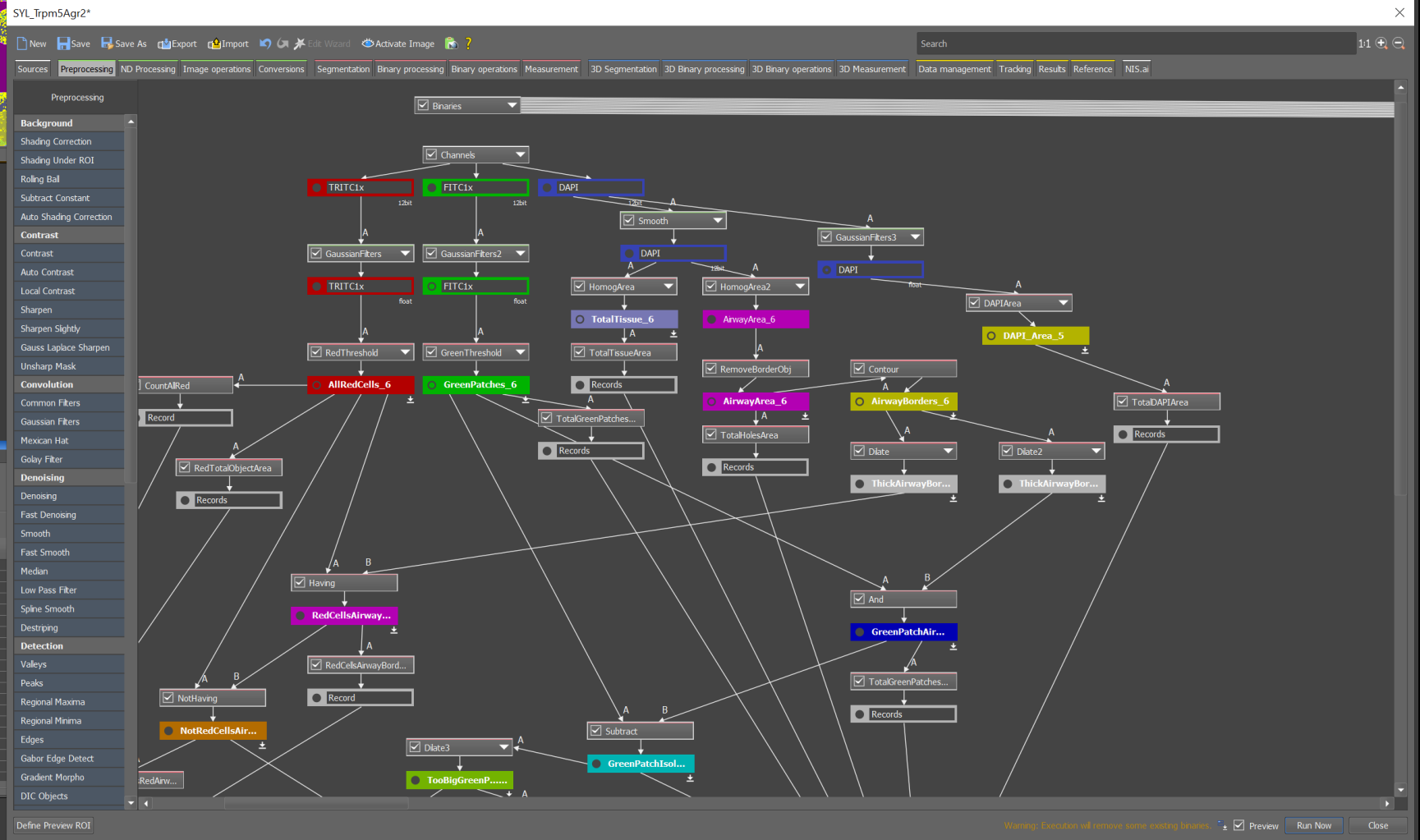
Hiroyuki Hakozaiki
Data Analysis and Special Projects

Our Analysis Philosophy

- We use the GA3 feature in NIS Elements, which is free for our users on our offline stations



Binary Layer	Color
Working Layers	
DAPI_Area_5	[1] Yellow
TotalTissue_6	[1] Blue
AirwayArea_6	[1] Magenta
GreenPatches_6	[1] Green
AllRedCells_6	[1] Red
RedCellsInGreenPatch_6	[1] Cyan
NotRedCellsAirways_6	[1] Orange
RedCellsAirwayBorders_6	[1] Pink
GreenPatchIsolated_6	[1] Light Green
TooBigGreenP..._5	[1] Yellow-Green
GreenPatchAirway_6	[1] Light Blue
AirwayBorders_6	[1] Yellow
ThickAirwayBorders_6	[1] Yellow
ThickAirwayBorder_6	[1] Yellow
Stored Layers	



Our Analysis Philosophy

- We use the GA3 feature in NIS Elements, which is free for our users on our offline workstations
- Otherwise, we only use open-source solutions
 - CellProfiler
 - We hosted a CellProfiler workshop in early 2020
 - Fiji
 - Python
- We are bringing users together in affinity groups for high-content, super-resolution, and light sheet imaging to promote the sharing of methods and solutions

Ongoing Analysis Projects

- Spatial transcriptomics
- Segmentation and tracking of Kawasaki and COVID-19 patient neutrophil samples
- High-throughput analysis of lipid droplet formation
- Lung damage models quantitating cell type and spatial distribution
- Measuring COVID-19 infection and spread in vitro and in organoids

The Future Of Image Analysis

