Sensori CMOS ARCADIA
dalla ricerca all'innovazione

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INFN.Open: Open INnovation from Fundamental Nuclear Research

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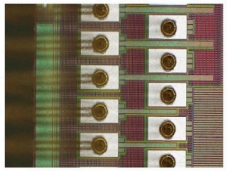
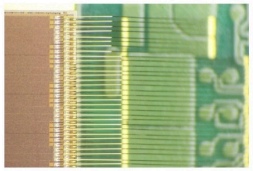
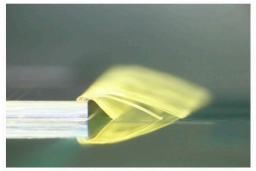
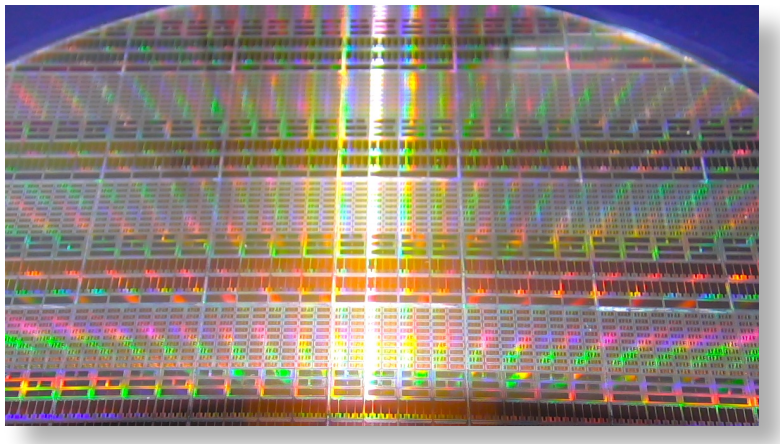
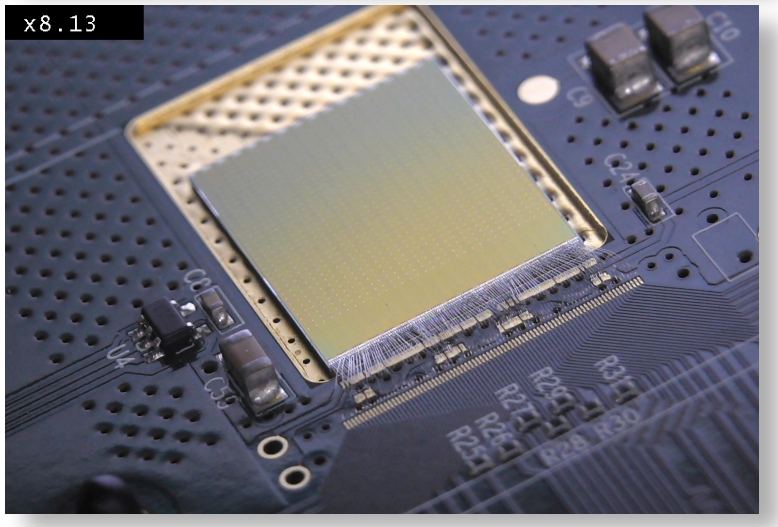
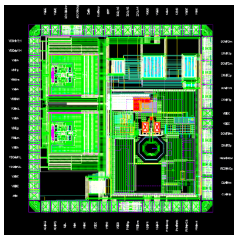
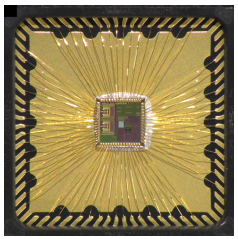
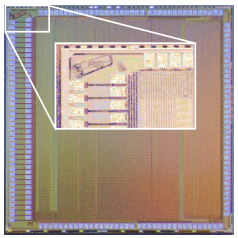
Microelettronica e Sensori CMOS all'INFN

- Progettazione **elettronica** e **microelettronica** analogica e digitale
- Progettazione VLSI mixed-signal ASICs per lettura rivelatori radiazione e sensori a semiconduttore
- CMOS ICs per ambienti estremi: radiazione e temperatura (criogenia)
- Dal concetto iniziale alla realizzazione del sistema completo
- Attività tipicamente in collaborazione con altri partner - sezioni e laboratori INFN, atenei ed istituti di ricerca - e con aziende private
- Progettazione schede PCB, FLEX ed interposer in silicio
- Sviluppo sistemi acquisizione dati avanzati basati su FPGA
- Attività di testing, integrazione e commissioning
- Backend: wafer probing, wafer dicing, wire bonding e flip-chip bonding

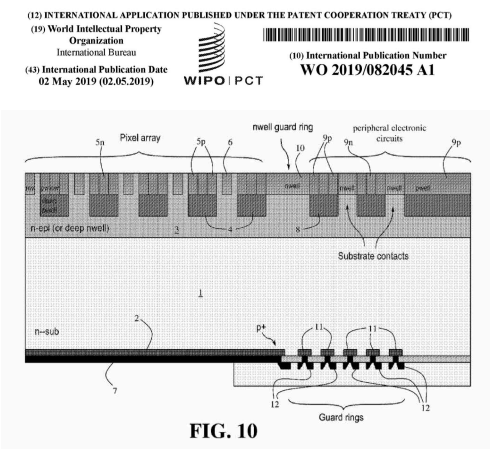







ARCADIA: Fully-Depleted Monolithic Active Pixel Sensors

Advanced **R**eadout **C**MOS **A**rchitectures with **D**epleted **I**ntegrated sensor **A**rrays

- **ARCADIA:** sviluppo e produzione di sensori monolitici CMOS deep-submicron ad alta efficienza di raccolta
  - Ricerca collaborativa tra INFN (Call CSN5) e fonderia di silicio (LFoundry, Avezzano)
  - R&D in tecnologia di sensori a semiconduttore, progettazione IP-cores e ASICs, sistemi acquisizione dati
  - Applicazioni in ambito medico (CT), futuri esperimenti in fisica delle alte energia e astroparticellare
  - Architetture a bassa potenza per rivelatori di fotoni e particelle cariche: 10 mW/cm^2
  - Sensori innovativi CMOS monolitici con guadagno per rivelatori con misura del tempo di volo (TOF)
  - Processo proprietario nella produzione di wafers con BSI (> 400µm) per imaging dei raggi X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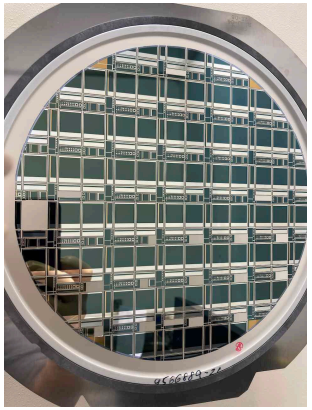
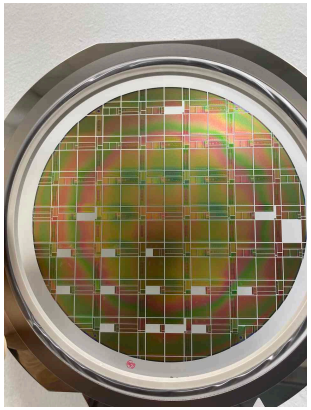
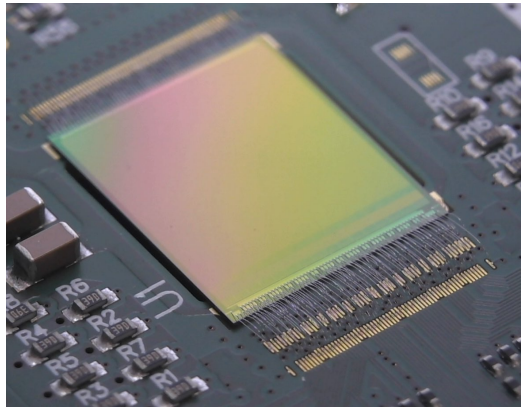
(19) World Intellectual Property Organization
International Bureau
(43) International Publication Date
02 May 2019 (02.05.2019)
WIPO | PCT
(10) International Publication Number
WO 2019/082045 A1

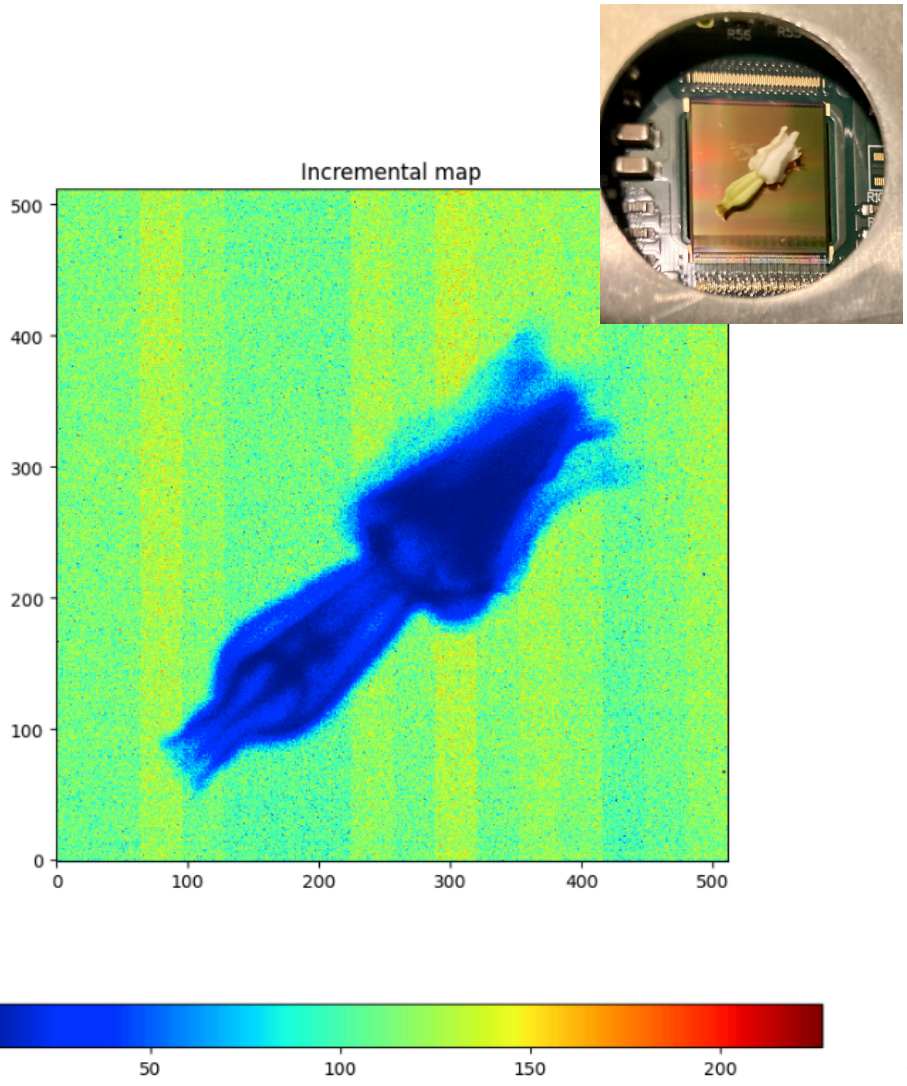
FIG. 10

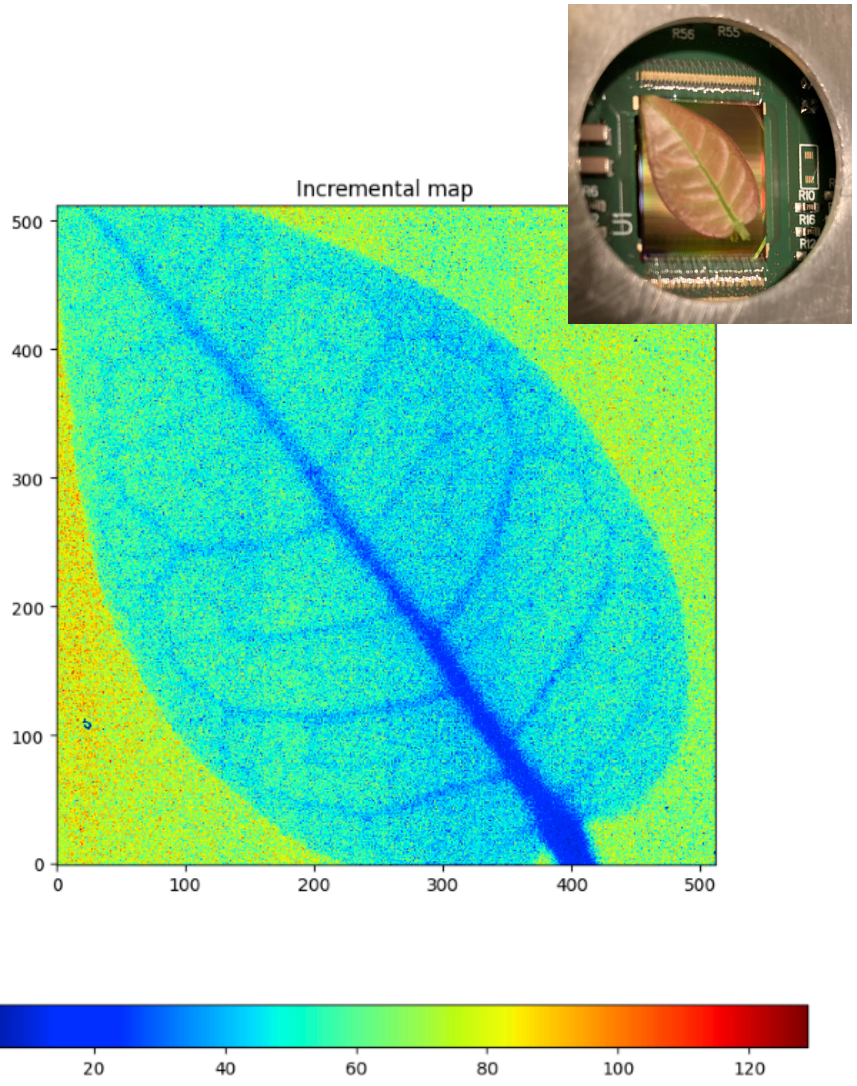






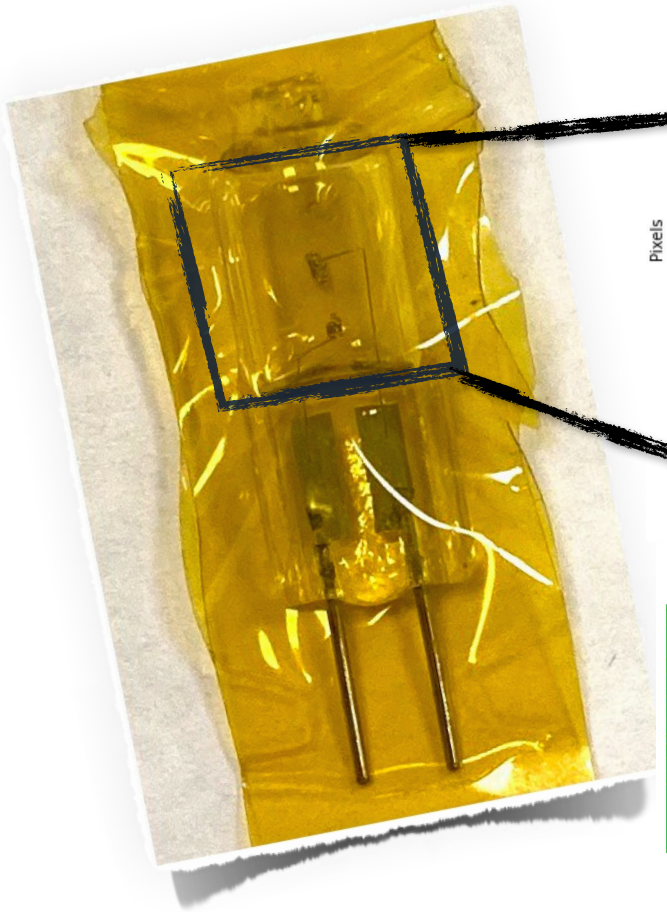
Sensori CMOS ARCADIA: X-ray 55Fe (6 keV)

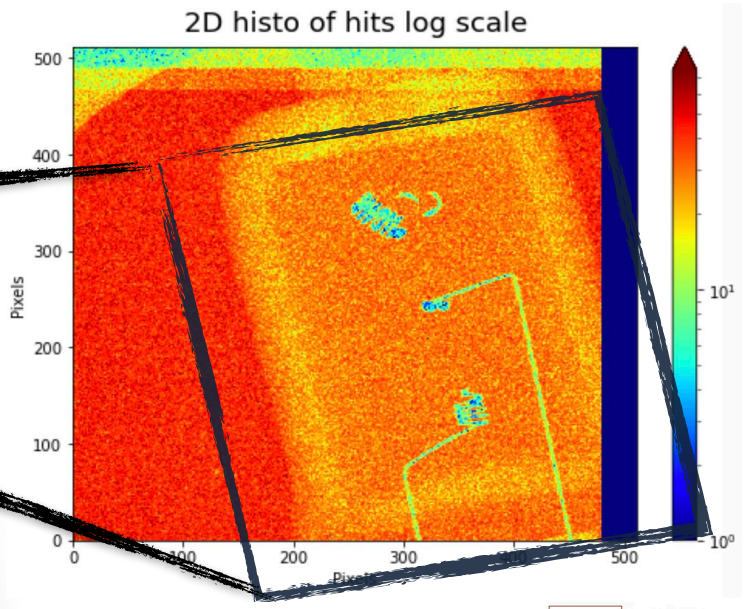


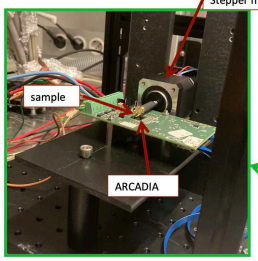


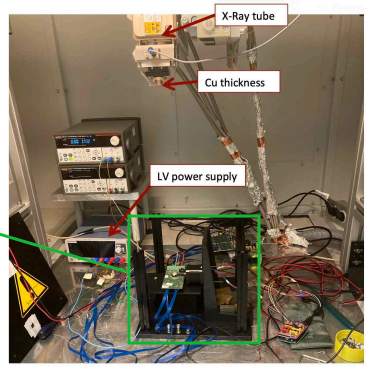
Sensori CMOS ARCADIA: X-ray tube and CT

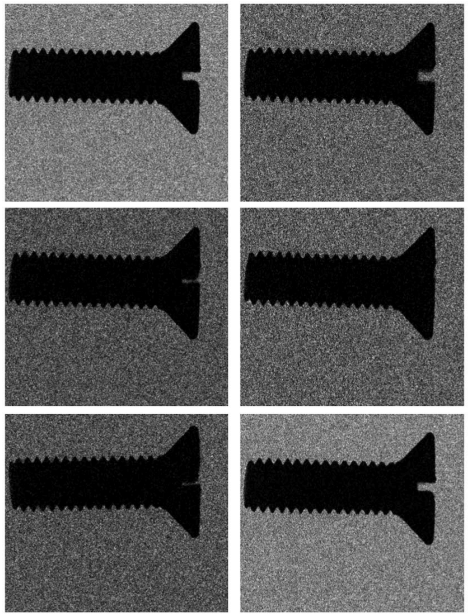
- X-ray setup (2 mA, 40 kV) with W tube (8.40 keV and 9.67 keV)
- Radiography samples and CT reconstruction (stepper motor, 1.8 deg)

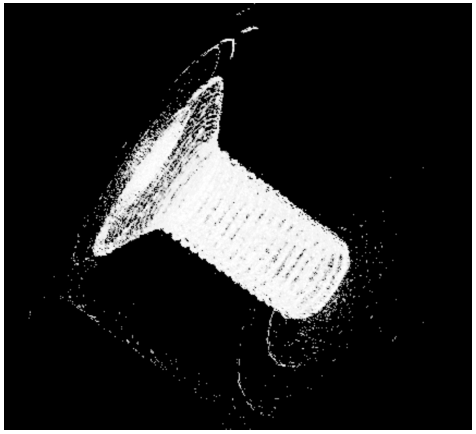




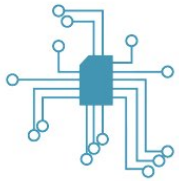








Sensori CMOS ARCADIA: dalla ricerca all' innovazione



CSN5
Ricerca
Tecnologica

ARCADIA - Advanced Readout CMOS Architectures with Depleted Integrated sensor Arrays

INFN CSN V - Open Call 2018

ARCADIA

Title: ARCADIA - Advanced Readout CMOS Architectures with Depleted Integrated sensor Arrays

Research Field: Detectors and Electronics

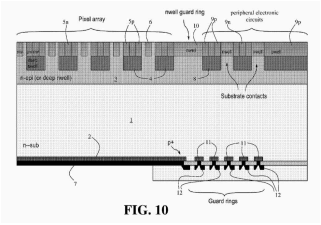
Principal Investigator: Manuel Dionisio Da Rocha Rolo, INFN Sez. Torino

Research Units: INFN Sez. Bologna, Milano, Padova, Pavia, Perugia, Torino, TIFPA

The European Innovation Council work programme 2024 opens funding opportunities worth over €1.2 billion for strategic technologies and scaling up companies. The majority is dedicated to SMEs and start-ups to develop and scale up "deep tech" innovations in critical fields such as generative artificial intelligence (AI), space, critical raw materials, semiconductors and quantum technologies.

European Innovation Council

EIC Pathfinder Open



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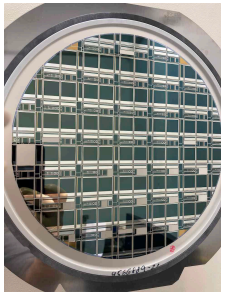
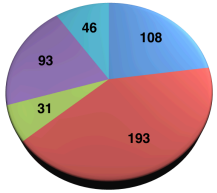


- Sensor Design
- DAQ
- Radiation hardness
- CMOS Design
- Applications

Month/personnel per Work-Package



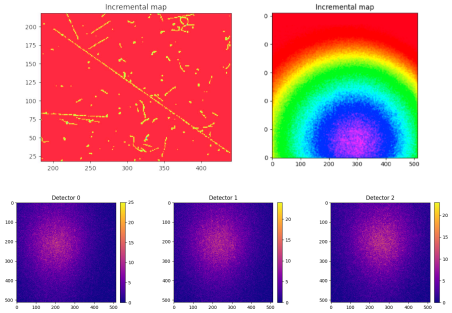
Next-generation high-resolution clinical X-ray photon-counting Computer Tomography

Sviluppo tecnologico con progetti INFN CSN5

SEED
300k€
4 FTE/yr

(10) International Publication Number
WO 2019/082045 A1

ARCADIA
1.4M€
15 FTE/yr



Scale-up in collaborazione con aziende

Horizon Europe Programme (EIC+ERC)
1.4M€

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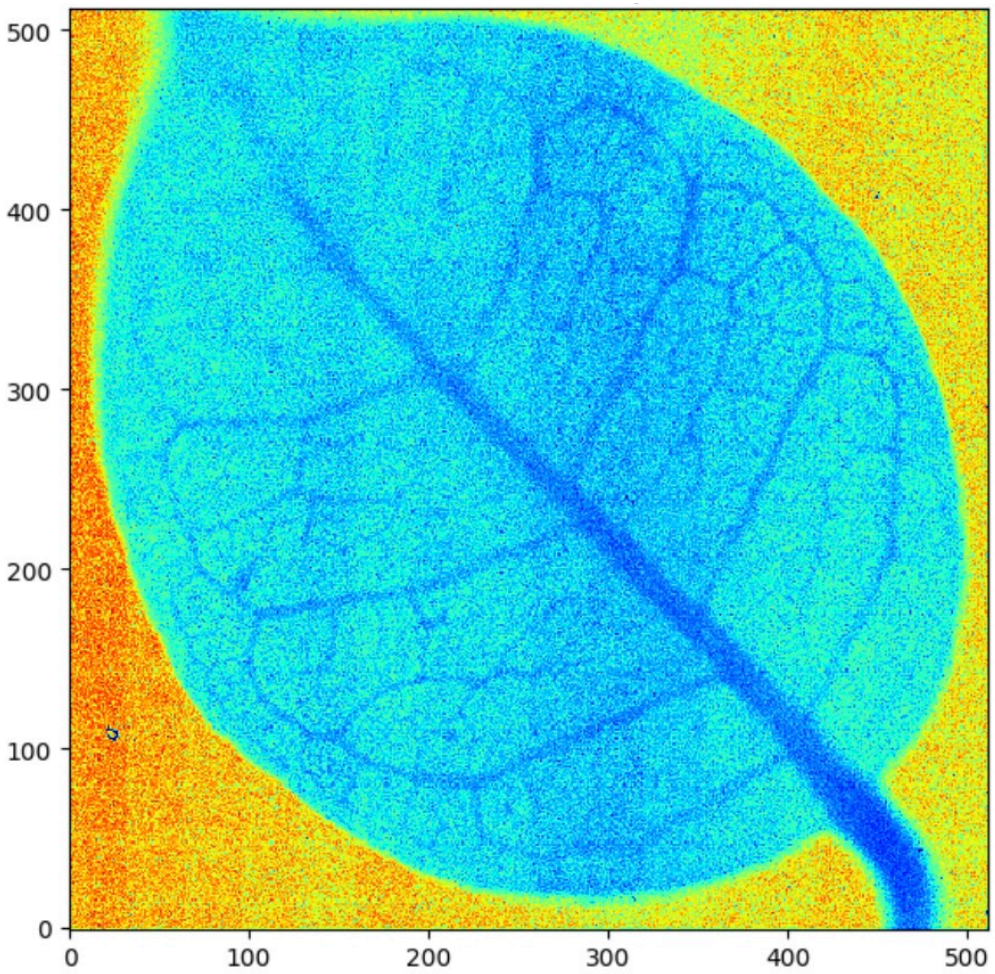

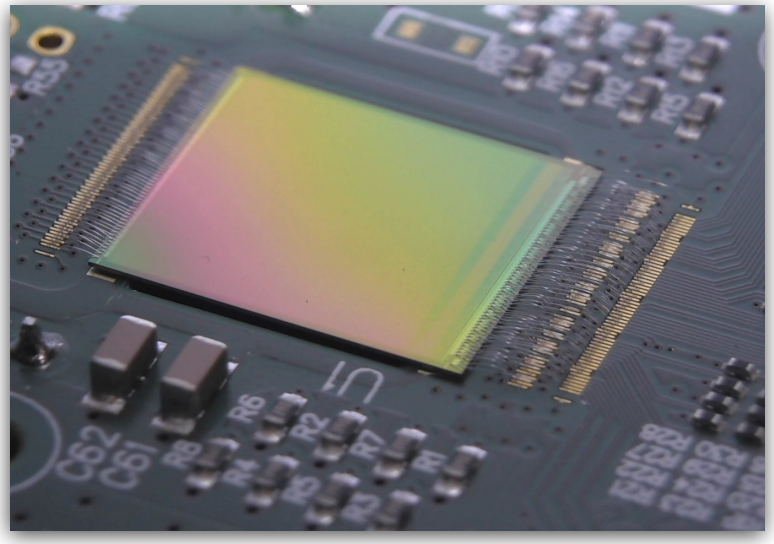

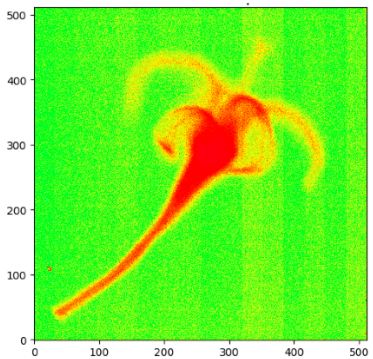

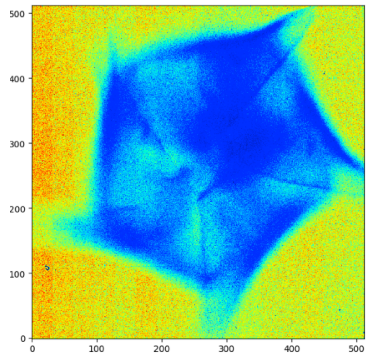

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