

# Sifting data into cohesive datasets suitable for AI/ML

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## Who am I?

- Software engineer by training
- Team lead at Agfa HealthCare, Integrations and Customizations
- Coordinator, SIIM Hackathon



# Society for Imaging Informatics in Medicine (SIIM)

## Supporting Healthcare Through Innovation, Creativity, and Discovery

The Society for Imaging Informatics in Medicine (SIIM) is the leading healthcare professional organization representing the interests and goals of those who work with and whose work is affected by the rapidly changing world of imaging technologies and information management. SIIM seeks to spearhead research, education, and discovery of innovative solutions to advance imaging informatics, enable the best use of images throughout the healthcare enterprise, and improve the delivery and quality of patient care.

SIIM facilitates this mission through activities such as:

- SIIM 2019 Annual Meeting | June 26 – June 28, 2019 | Denver, CO | [SIIM.org](https://www.siiim.org)
- Annual SIIM Hackathon hosted at SIIM - aimed at supporting workflow and process improvement across healthcare to provide a set of cloud-based APIs to highlight the next generation of health IT standards
- Regional meetings and an annual meeting dedicated to Machine Intelligence in Medical Imaging (C-MIMI)
- Publication of the Journal of Digital Imaging
- Educational Webinar Series, eCommunity, Online Learning Materials and More! [SIIM.org](https://www.siiim.org)

# AI-Ready Research Portal

# AI-Ready Research Portal

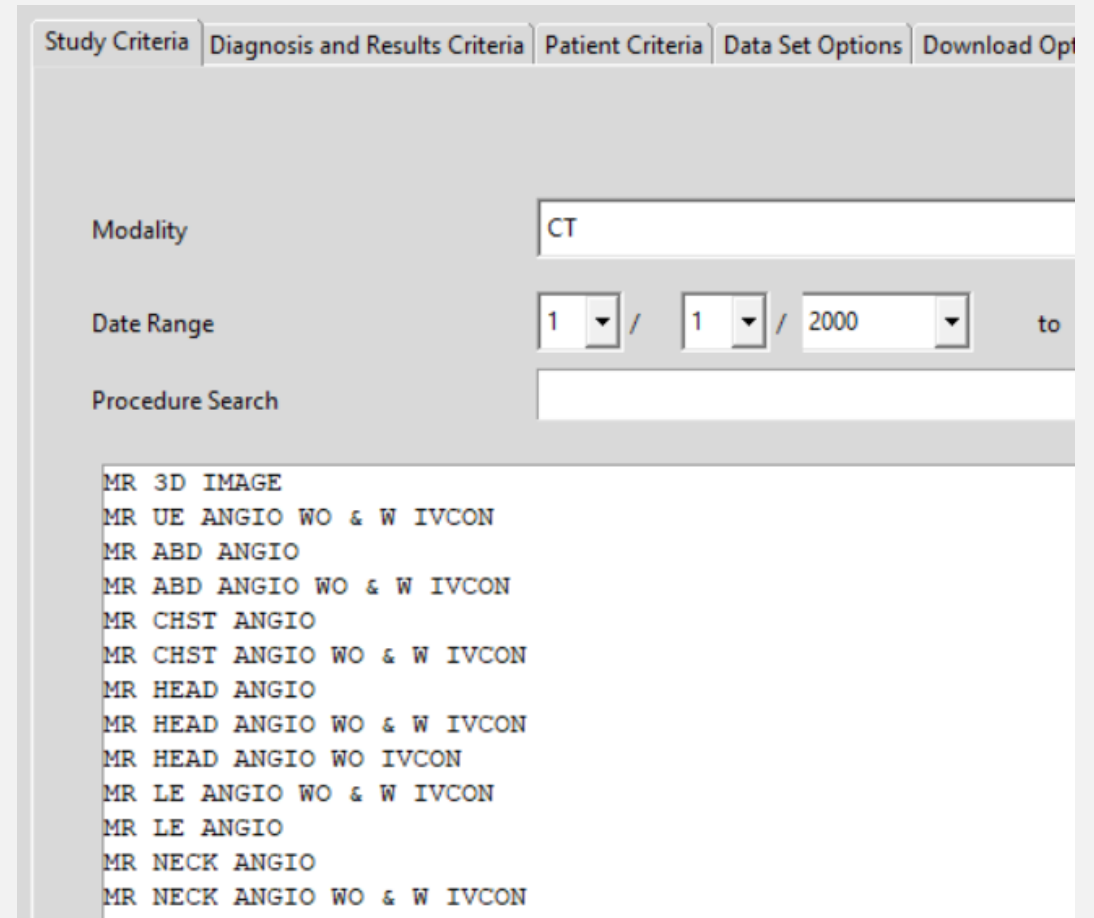
- SIIM 2018 Hackathon Winner
- Aims to streamline discovery and anonymization of data.
- Being developed into a standalone virtual machine with web GUI
  - Open source license



**MARQUETTE**  
**UNIVERSITY**

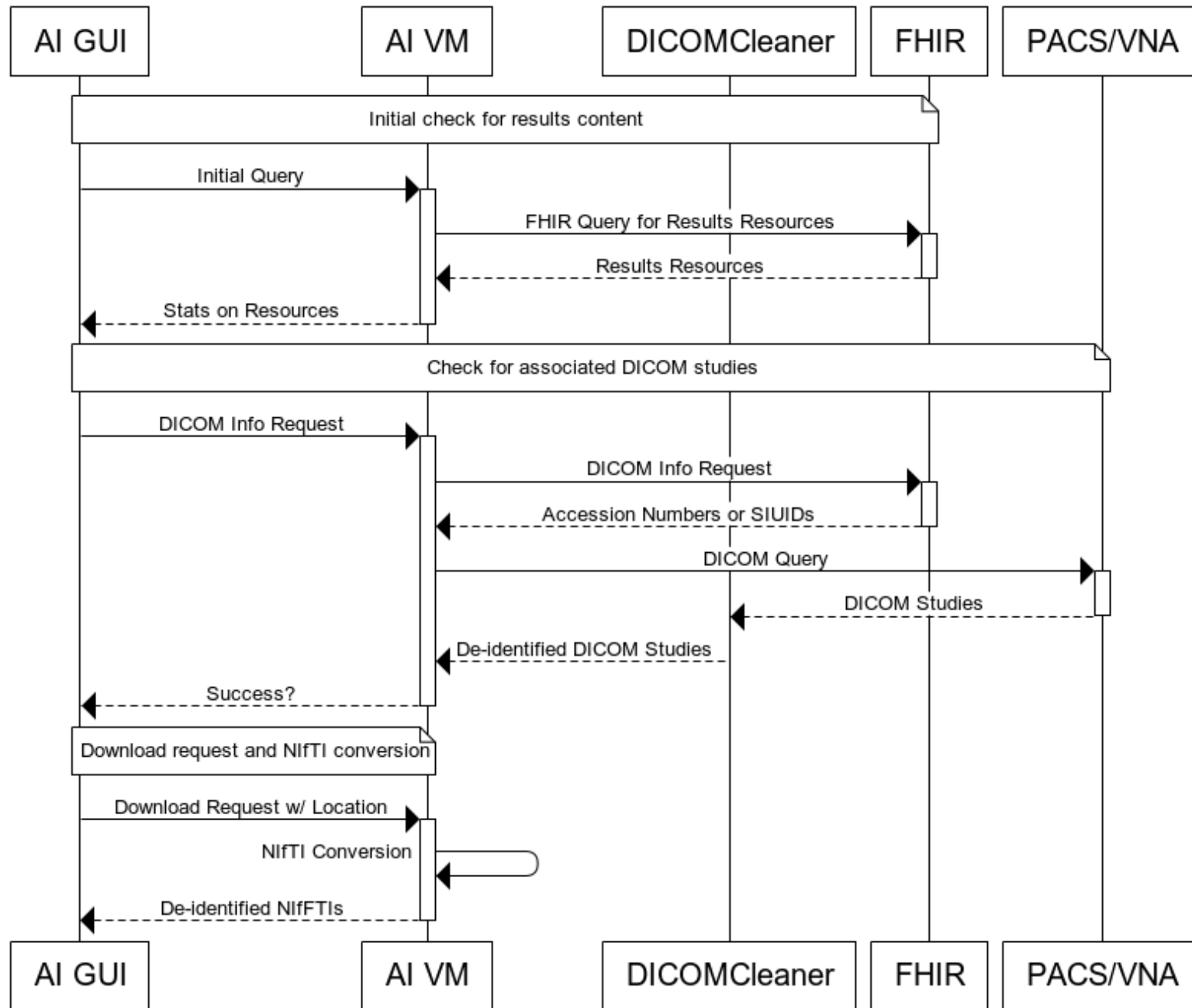
# AI-Ready Research Portal

- Query for images using modality and diagnosed condition
  - Condition in plain text (lung tumor) or SNOMED code (254637007)
- Portal uses FHIR and DICOMweb to find and collate the dataset
  - Includes anonymization and conversion to NIfTI format



The screenshot shows a search interface with the following elements:

- Navigation Tabs:** Study Criteria, Diagnosis and Results Criteria, Patient Criteria, Data Set Options, Download Opt
- Modality:** A text input field containing "CT".
- Date Range:** A date range selector showing "1" / "1" / "2000" with dropdown arrows, followed by "to".
- Procedure Search:** An empty text input field.
- Search Results:** A list of medical procedures:
  - MR 3D IMAGE
  - MR UE ANGIO WO & W IVCON
  - MR ABD ANGIO
  - MR ABD ANGIO WO & W IVCON
  - MR CHST ANGIO
  - MR CHST ANGIO WO & W IVCON
  - MR HEAD ANGIO
  - MR HEAD ANGIO WO & W IVCON
  - MR HEAD ANGIO WO IVCON
  - MR LE ANGIO WO & W IVCON
  - MR LE ANGIO
  - MR NECK ANGIO
  - MR NECK ANGIO WO & W IVCON



# FHIR Maker

<https://github.com/sglanger/FHIRmaker>



## FHIR Maker

- Built to crawl public, annotated imaging archives (e.g. TCIA) and create Patient, Condition, Diagnostic Report and Imaging Study FHIR resources.
- Great if you do not already work for a hospital or have access to a private dataset.

MAYO  
CLINIC



## How does it work?

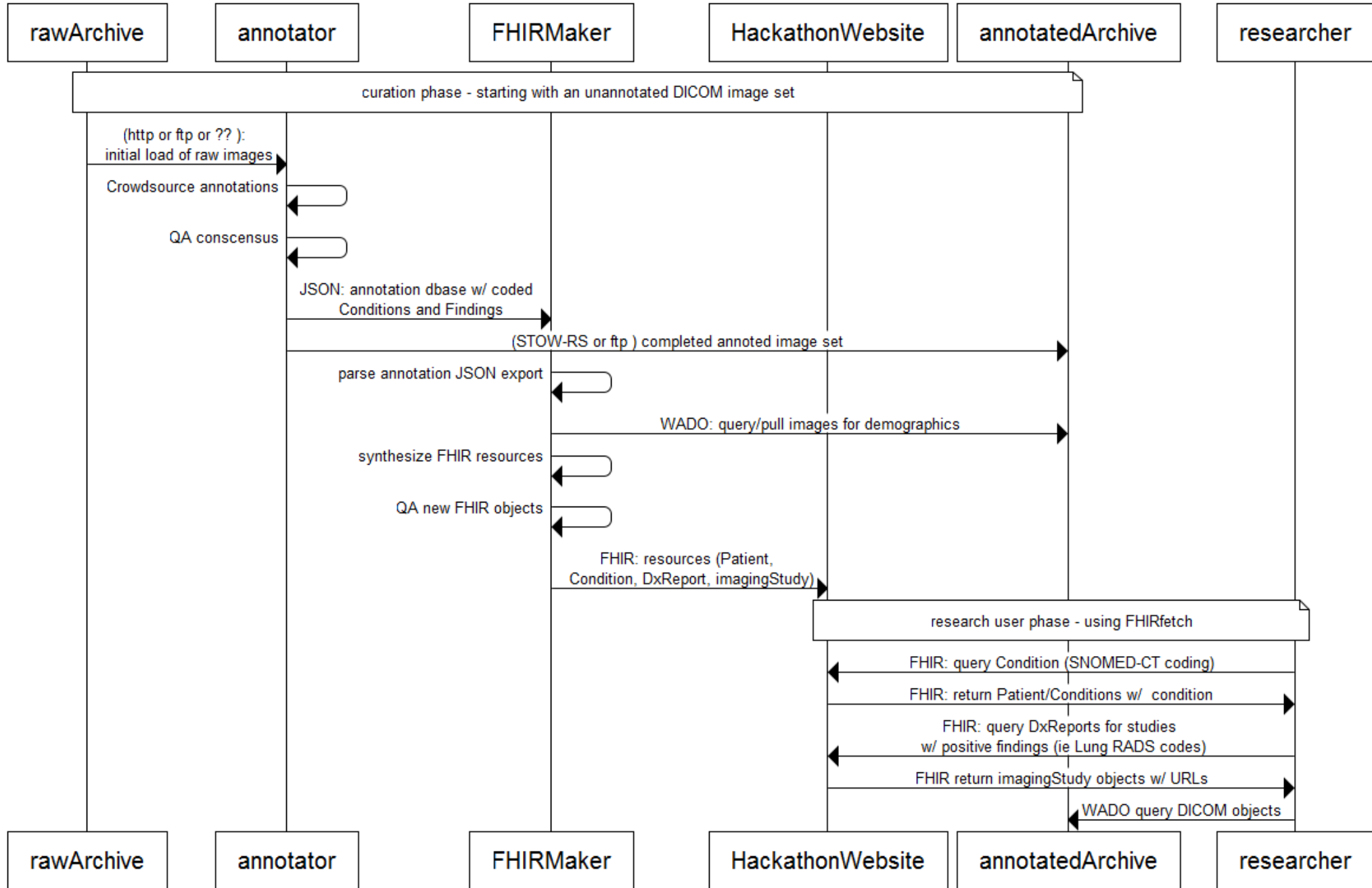
- Plug-in any API keys for the servers you're using, e.g.
  - The Cancer Imaging Archives (TCIA)
  - National Institutes of Health (NIH)
- Define your search criteria and unleash FHIR Maker
- FHIR and DICOM objects are ready for your consumption!

MAYO  
CLINIC



# FHIRMaker workflow

protocols between actors are specified on the first part of the transaction labels



# Comparing the two

## AI-Ready

- Great for a researcher within an institute
- Assumes availability of FHIR and DICOM servers
- Standalone VM with web GUI

## FHIR Maker

- Optimized for an already public dataset
- Makes FHIR resources from DICOM data
- Command-line tool

Thank you!

Questions?

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