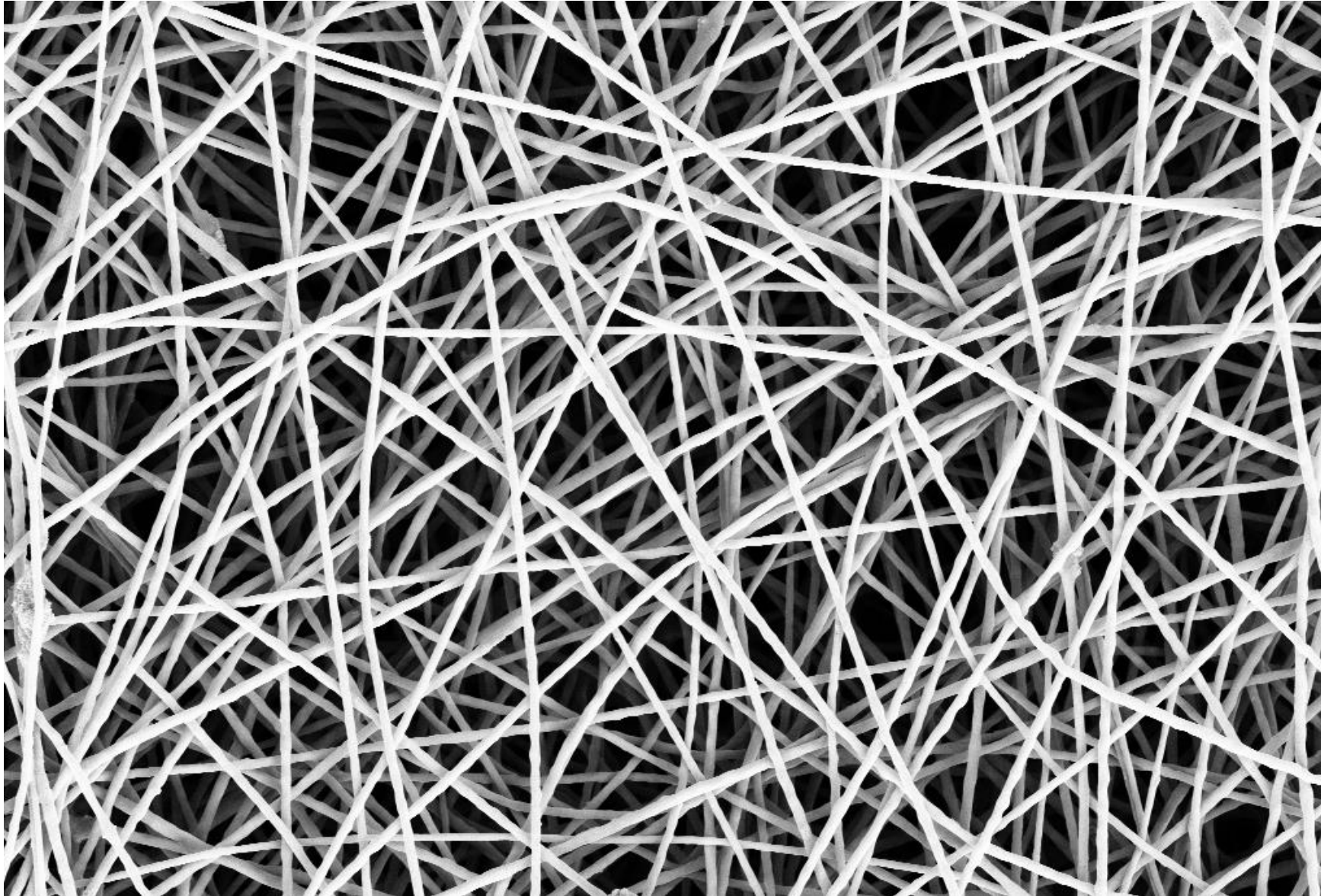# Anomaly Detection

Mathematical Models and Methods for Image Processing
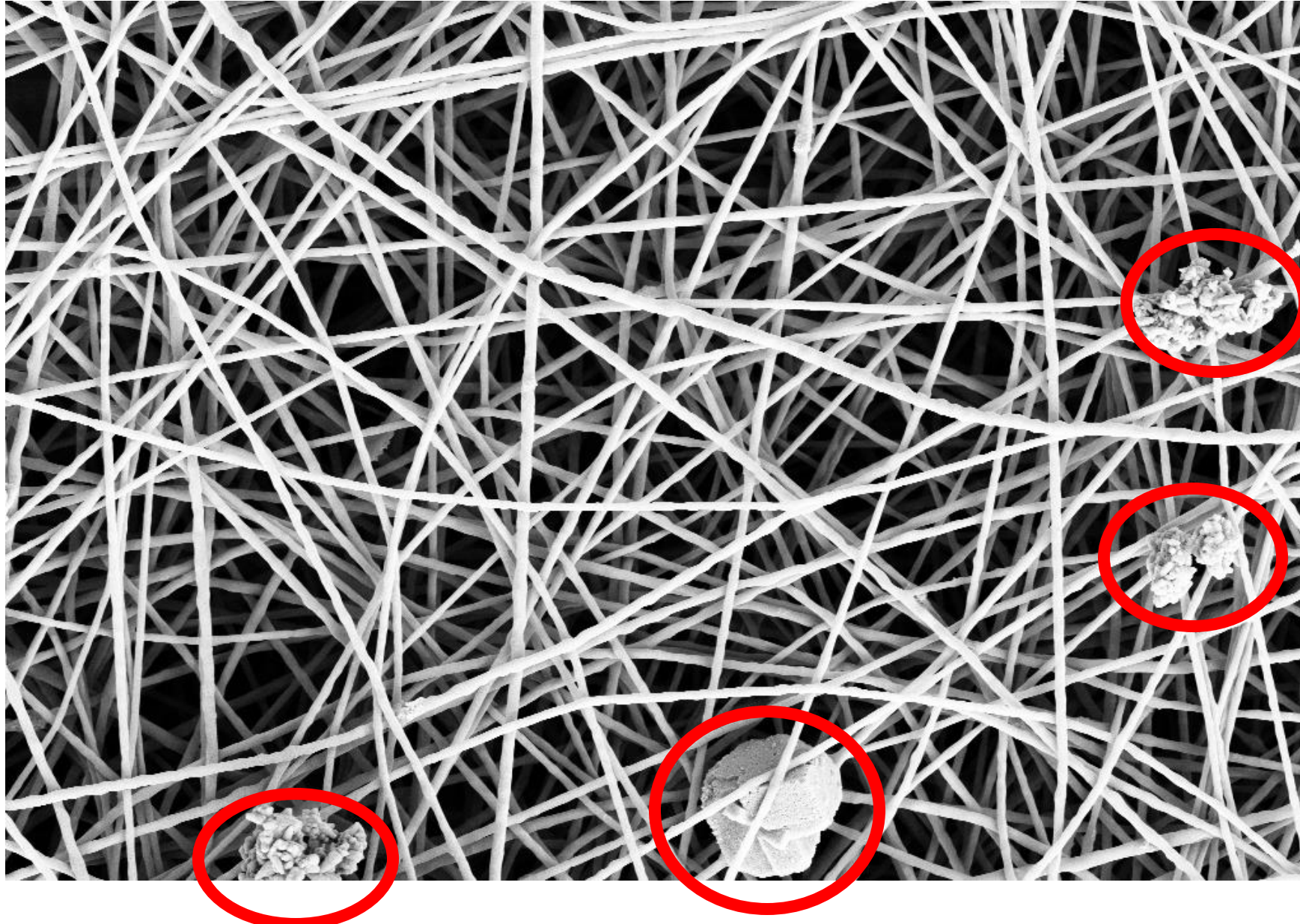
Edoardo Peretti

May 8th 2025
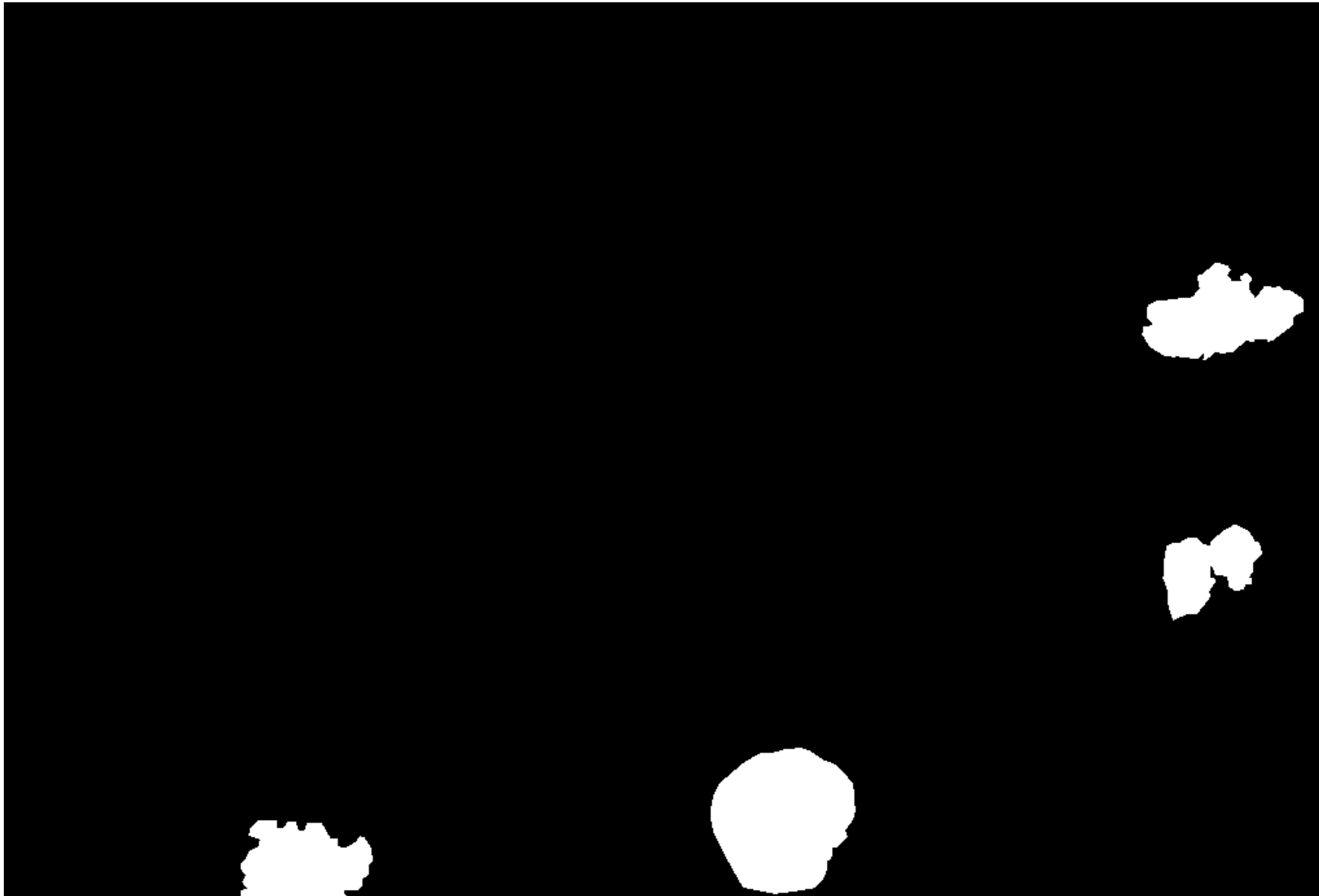
The anomaly detection problem

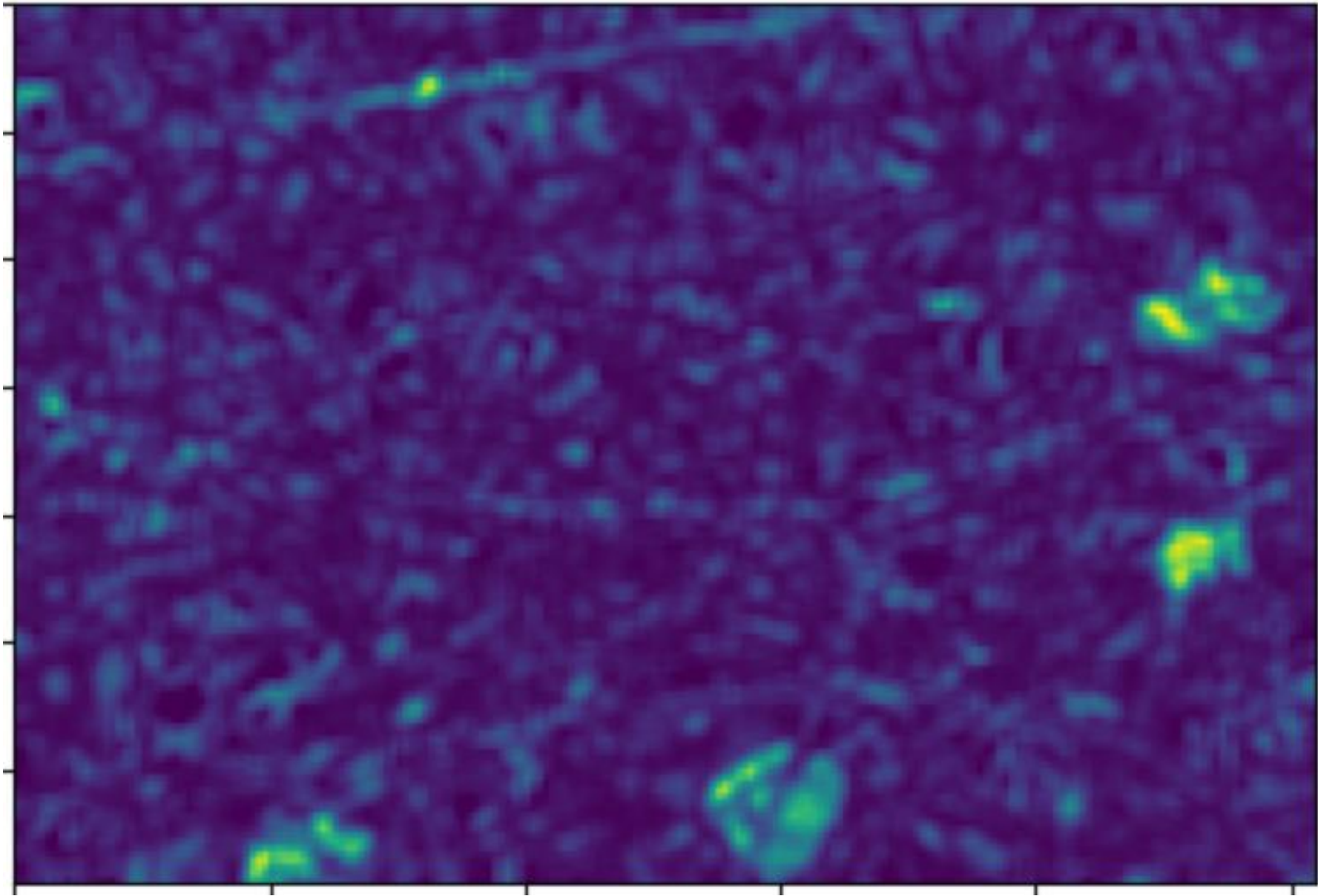E. Peretti

The anomaly detection problem

E. Peretti

The anomaly mask

Heatmap

Detections

Training Image

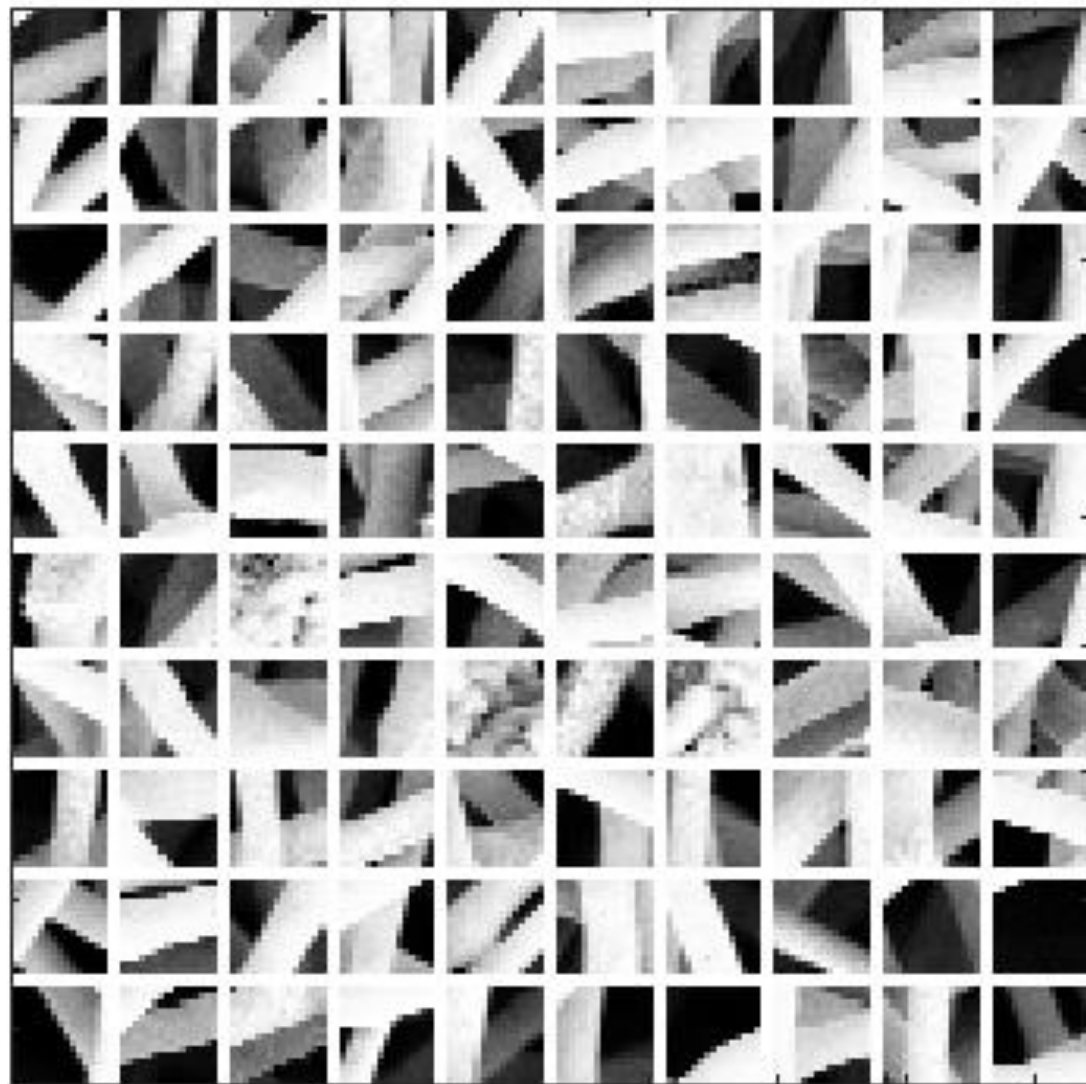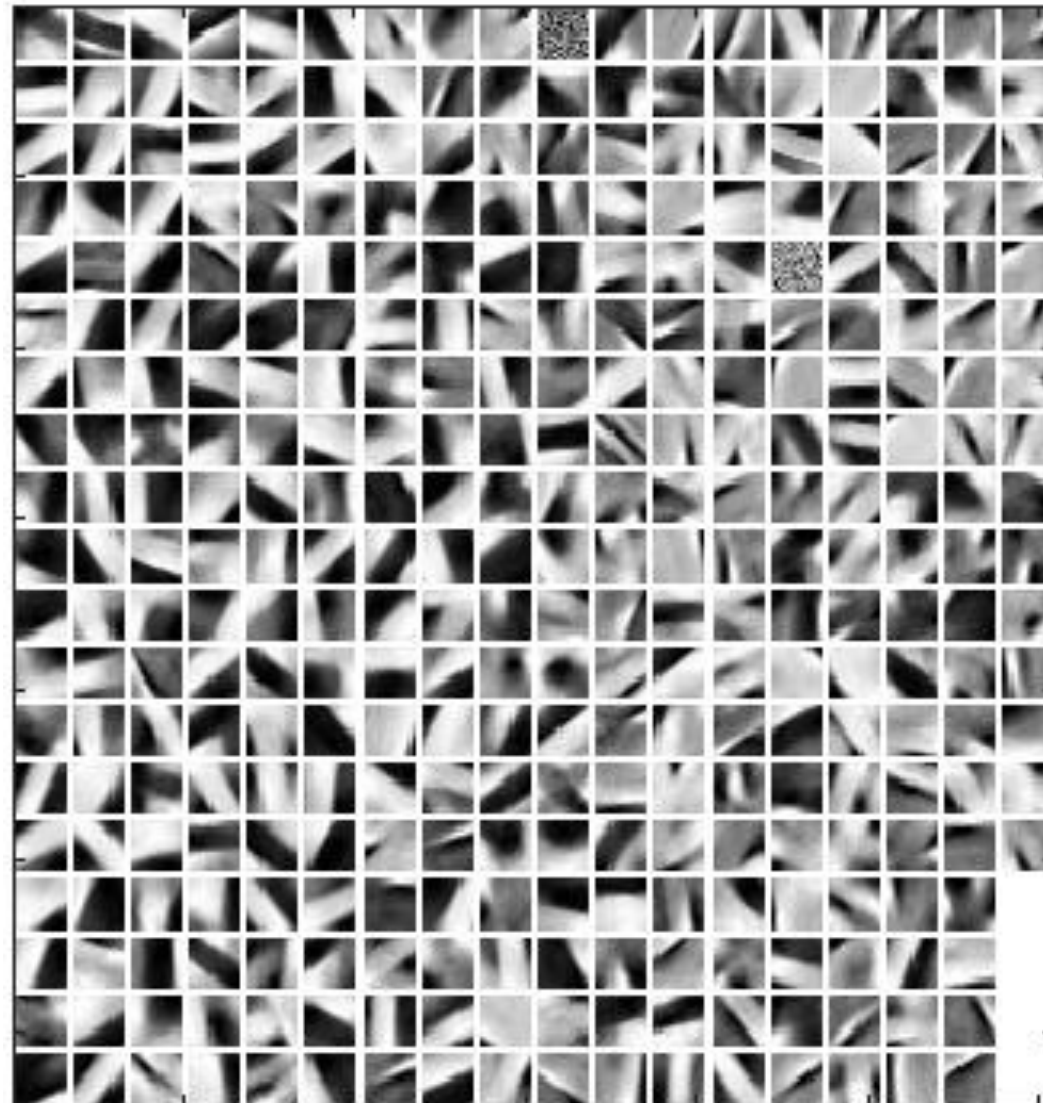E. Peretti
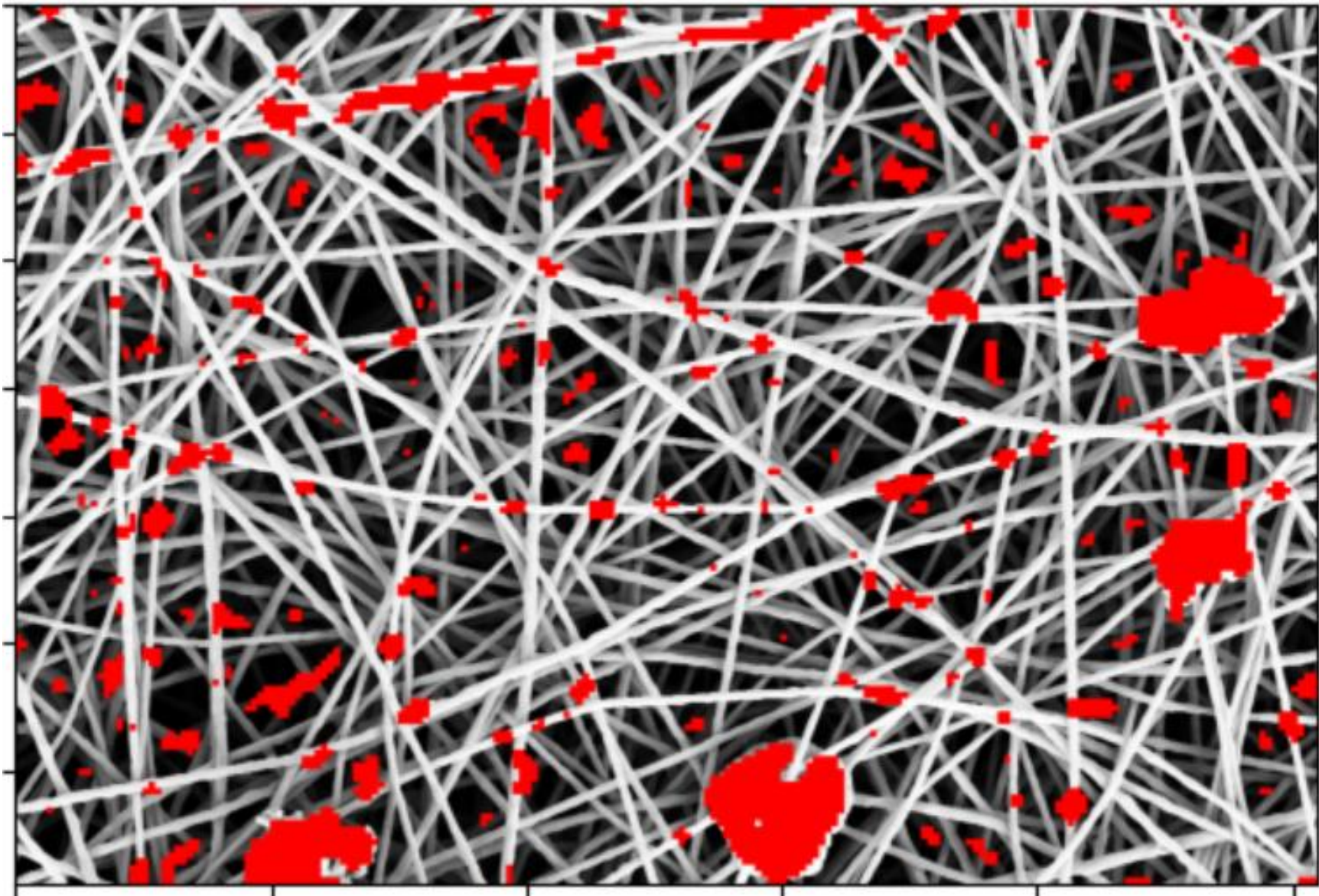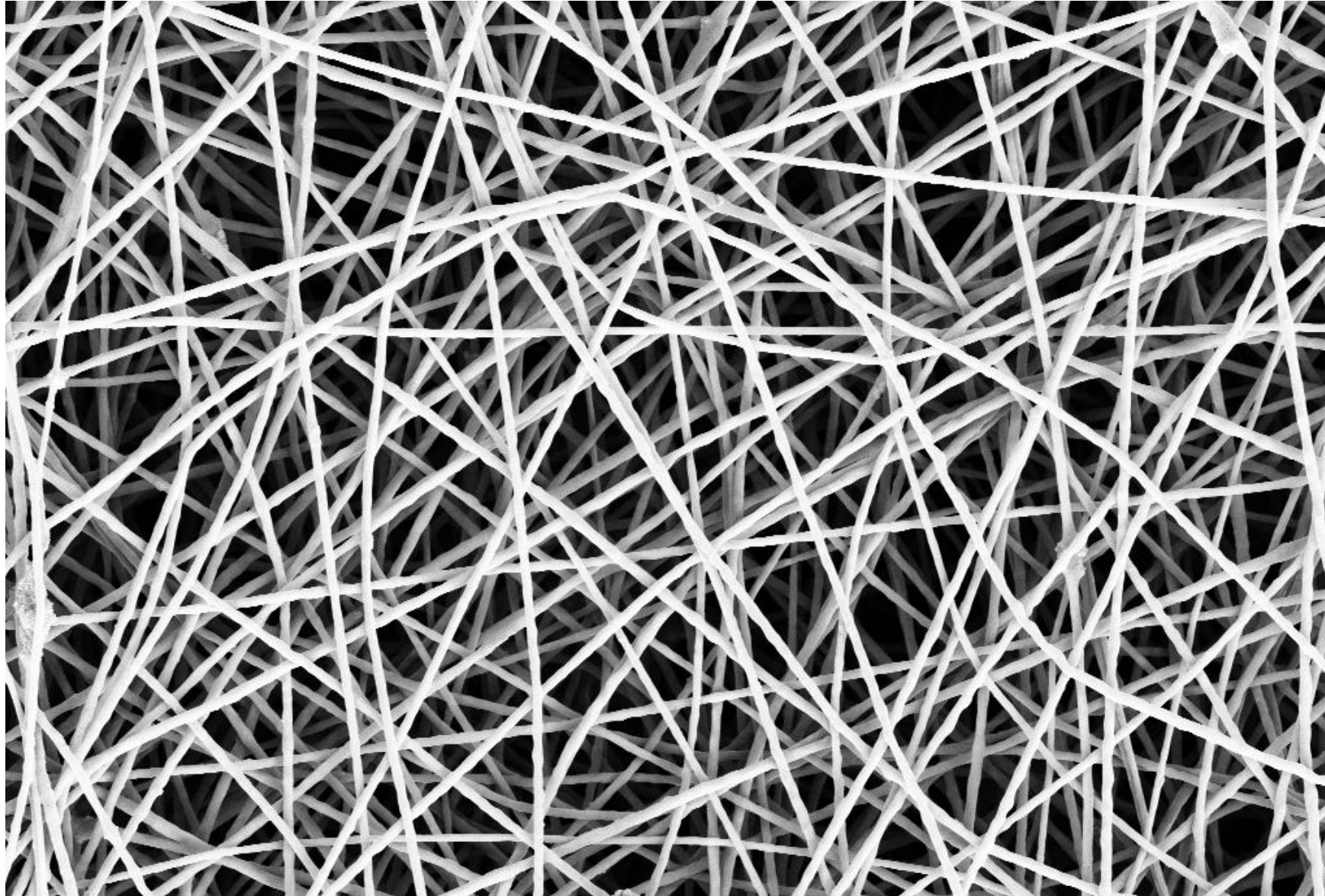
Normal Patches

Learned Dictionary

E. Peretti

Assignments

- Implement the anomaly detection based on ℓ_1 sparse coding
  - Use 15x15 patches
  - You can improve the results by fine tuning all the parameters

References

- Carrera, Diego, et al. "Defect detection in SEM images of nanofibrous materials." IEEE Transactions on Industrial Informatics 13.2 (2016): 551-561.
- Carrera, Diego, et al. "Scale-invariant anomaly detection with multiscale group-sparse models." 2016 IEEE International Conference on Image Processing (ICIP). IEEE, 2016.