Open Kinetic Modeling Initiatives to Accelerate Quantitative Molecular Imaging Research

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Introduction

- Radiotracer kinetic modeling has a long research history in molecular imaging with positron emission tomography (PET), but its broad clinical applications have been hampered due to limited scanner performance

- Along with the recent boost in sensitivity of commercial PET scanners and the advent of total-body PET technology, there is an urgent need to accelerate kinetic modeling research and clinical translation

- However, the field is challenged by insufficient state-of-the-art kinetic modeling resources, limited access to educational opportunities, and a lack of young-generation researchers

Methods

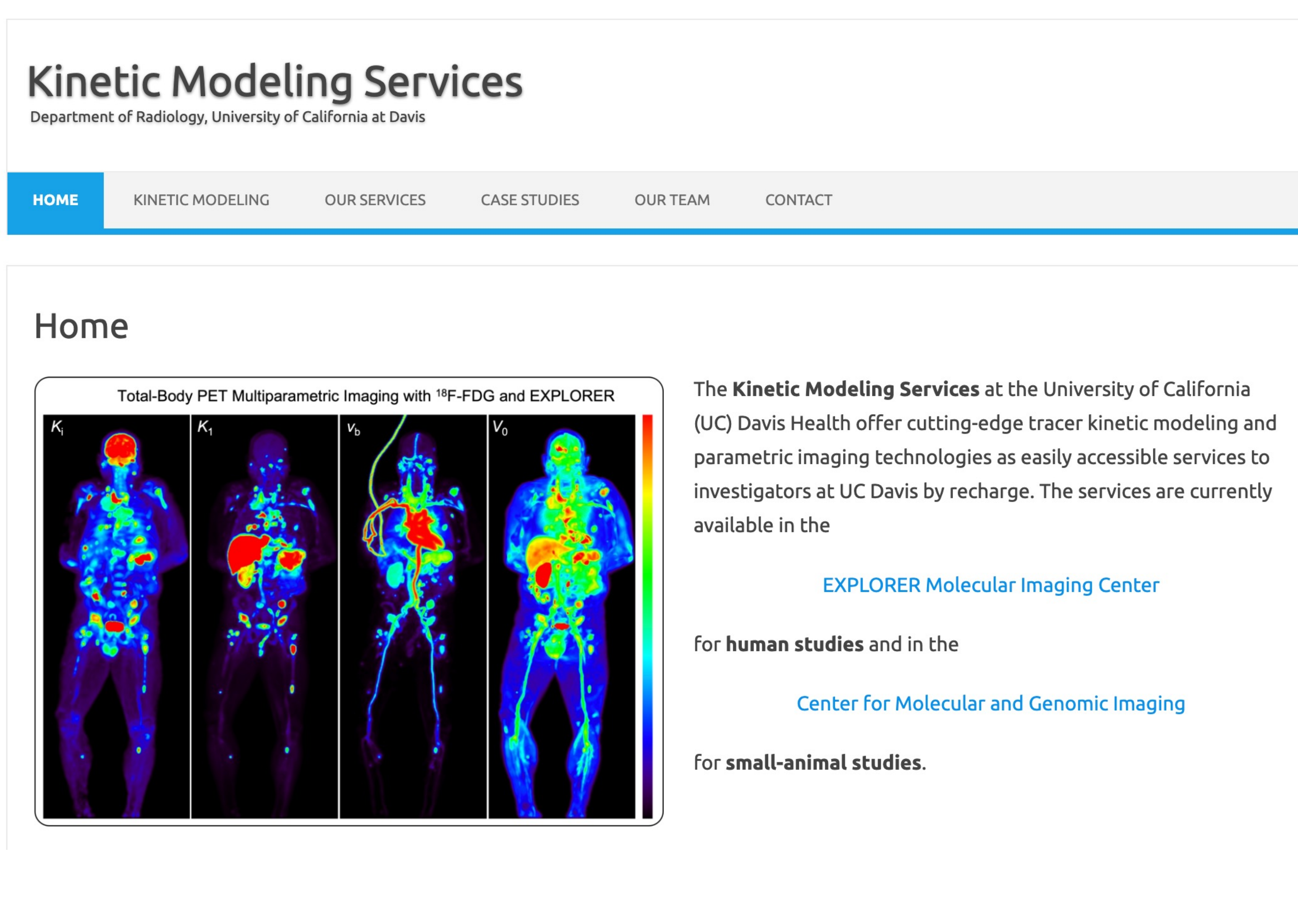We are addressing these challenges by creating two initiatives:

- The Kinetic Modeling Services (KMS) at UC Davis to offer state-of-the-art kinetic modeling as a service to clinical and preclinical investigators

- The international Open Kinetic Modeling (OpenKM) Initiative to disseminate and promote tracer kinetic modeling in the wider technical society

Results

The UC Davis KMS is becoming available via

- the UC Davis EXPLORER Molecular Imaging Center for human studies

- the Center for Molecular and Genomic Imaging for small animal and non-human primate studies

- and the Companion Animal Imaging Center for large animal studies

tmi.ucdavis.edu

The OpenKM Initiative for the international community consists of

- an education effort to organize open-access short courses and webinars

- and a resource effort that opens datasets and codes

These efforts are in collaboration with leaders from multiple institutions (e.g., Yale University) and with an initial grant from the IEEE Nuclear and Plasma Sciences Society.

https://www.openkmi.org/

Summary

The two internal and external open kinetic modeling initiatives are expected to help accelerate quantitative molecular imaging research and translation both at UC Davis and across international sites.