Master Thesis Projects
Suggestions for 2019-2020
Projects

• Automatic evaluation of tissue segmentation quality in medical images

• Sharing personal health information on the web in a secure and compliant manner

• Automated orchestration of cloud based computing resources
Automatic evaluation of tissue segmentation quality in medical images

- Required skills: Machine learning, image analysis
- A key concept at AMRA is atlas-based segmentation using non-rigid registration. Unsuccessful registrations that need adjustments are manually identified by inspecting the resulting segmentations. In order to reduce manual work, we would like to identify unsuccessful registrations automatically. The goal of this project is to evaluate different strategies for classifying and describing the quality of a registration, and to implement a prototype using at least one of these strategies.
Sharing personal health information on the web in a secure and compliant manner

- **Required skills**: Computer security, web technologies

  The aim of this project is to investigate how personal health information created at AMRA by our image analysis service can be shared in a safe, secure and compliant manner on the web directly with customers, partners and end users. How can we use federated security models for safe and secure data exchange with users in different parts of the world? How do we expose personal health information in our databases only to the users that are allowed to view it? What kind of encryption and data transport strategies should be employed?
Automated orchestration of cloud based computing resources

- **Required skills**: Software engineering, distributed computing
- Currently, AMRA is operating an on premise cloud solution where we run our application suite in Docker containers. We want to take advantage of the elastic computing resources that operating in the cloud would give us. This Master thesis project should produce an inventory of some available technologies for constructing a hybrid cloud solution that can operate both with our current infrastructure and using cloud based solutions. Kubernetes and Nomad are two such technologies. It should also produce a prototype implementation evaluating at least one of the identified technologies.
Contact

Peter Karlsson Zetterberg

peter.karlsson.zetterberg@amramedical.com