

Some undergraduate project ideas

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Research Interests

- Scientific computing and algorithms
- Image processing (not suitable at u/g level)
- Inverse problems
- Smart clothing materials (not suitable at u/g level)
- Financial computing (not suitable at u/g level)
- Pharmacokinetics
- Noise and environment
- Ground water usage and contamination (not suitable at u/g level)

Scientific computing and algorithms

- Newton's methods

Systems of nonlinear equations

Change to minimisation problems

Quasi-Newton methods

Inexact Newton methods

Scientific computing and algorithms

- Laplace transformation and its applications to time dependent differential equations

Applications to first order odes

Applications to pde.

Applications to pharmacokinetics.

Inverse problems

- Estimate parameters of a differential equation

Find $g(x)$:

$$\frac{d^2 u}{dx^2} = g(x), \quad 0 < x < L, \quad u(0) = \alpha \quad u(L) = \beta$$

using a set of experimental data obtained.

This project can be started as parameter estimation of a simple model as in Advanced Algorithms – nonlinear least squares methods.

Noise and environment

- Develop models for the impact of noise on
 - (i) health – lung & heart
 - (ii) health – other chronic diseases
 - (iii) productivity