

Cerine Lal

Indian Institute of Technology, Madras, India
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EDUCATION

M.S by Research in Engineering, Biomedical Engineering with specialization in Image and Signal processing and Biophotonics (CGPA-8.33) 2011 - 2014

Indian Institute of Technology, Madras, India

Advisor: Dr. N. Sujatha

Thesis: Laser based image and signal processing for microcirculation assessment

B.Tech. in Applied Electronics and Instrumentation (Percentage-75%) 2006 - 2010
Rajagiri school of engineering and technology, Cochin, India

GRUATE COURSES

- Image signal processing
- Digital signal processing
- Biomedical Imaging systems
- Mathematical methods and algorithms in signal processing
- Lasers in machining and micromanufacturing
- Biomedical instrumentation
- Biomedical laser instrumentation

PROJECTS

- Worked towards developing signal and image processing techniques for micro circulation assessment from Laser speckle images and Laser Doppler perfusion signals. In particular, fractal based signal processing of laser speckle images was explored and developed it as a non destructive tool to study scatterer concentration and changes in fluid flow.
- Studied the changes in the constituent frequency bands (metabolic, neurogenic, myogenic, respiratory and cardiac) of Laser Doppler perfusion signals in diabetic and normal subjects through wavelet analysis to provide an assessment of microcirculatory impairment in Type 2 diabetes.

ACHIEVEMENTS

- GATE 2010, an all India based exam to select graduate students to Indian Institute of Technologies.
- Ministry of Human Resource Development (Government of India) scholarship for master studies.
- Student Travel grant scholarship for attending conference in Israel.

PUBLICATIONS (REFEREED JOURNAL ARTICLES)

- [1] **Cerine Lal**, Arnab Banerjee, N. Sujatha, "Role of contrast and fractality of laser speckle image in assessing flow velocity and scatterer concentration in phantom body fluids" **J. Biomed. Opt.** 18 (11), 111419 (2013).
- [2] **Cerine Lal**, N. Sujatha, "Correlation and wavelet analysis of Laser Doppler flowmeter signals to assess microcirculatory dynamics in diabetes", (Manuscript under review, Medical Engineering and Physics).

CONFERENCES

- [1] **Cerine Lal**, Arnab Banerjee, Sujatha Narayanan Unni, "Fractality Vs Contrast of laser speckle image: A tool for assessing flow velocity and scatterer concentration in phantom body fluids" (1st International Biophotonics Conference in Israel sponsored by **SPIE** (2012)).
- [2] Sujatha Narayanan Unni, **Cerine Lal**, "Laser based signal and image fractal analysis for assessment of blood flow", **Proceedings of SPIE** Vol. 8427, 84272M (2012).

SKILLS

Experimental

- Optical Imaging and Spectroscopy
- Experience with Diffuse reflectance set up, UV spectrophotometer, Lasers, and Fiber optics.

Software

- Image and signal processing in Matlab and Scilab.
- Experience using Labview, R and Pspice.
- Programming languages: C, C++, 8085 and 89C51 assembly language.

TEACHING EXPERIENCE

Teaching Assistant, IIT Madras

- Instrumentation Lab for first year graduate students: Conducted lab sessions for 20 graduate students and assisted the professor in making the tutorials for the lab [July 2011-Dec 2011].
- Biomechanics Lab for first year graduate students: Organised and demonstrated lab sessions for 20 graduate students and evaluated their performance [Jan 2013- May 2013].
- Introduction to Research Methodology course: Assisted the faculty in charge to organise the course for 50 first year research scholars of the department [Jan 2013-May 2013].

UNIVERSITY SERVICES

Member of Research Guidance Cell of IIT Madras

2012 - 2013

- Part of the team that constituted the Research Guidance Cell for the first time in IIT Madras.
- Involved in documenting the administrative procedures pertaining to research scholars and publishing of year book highlighting the research activities of the scholars.
- Organised workshops and research expos for the scholars from various departments with the aim of promoting interaction and awareness of the research activities in the campus.

PROFESSIONAL ASSOCIATIONS

International Society for Optical Engineering (SPIE), 2011 – present