BASIC INFORMATION:

Full name: Susovan PAL **Nationality:** India

Permit: long term residence permit in France/EU permanent resident

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Websites:

- Homepage: https://sites.google.com/view/susovanpal/
- LinkedIn: https://www.linkedin.com/in/susovan-pal-ph-d-90120498/
- Google Scholar: https://scholar.google.com/citations?user=uAbkQcgAAAAJ&hl=en

WORK EXPERIENCE I - ACADEMIC AND INDUSTRIAL RESEARCH:

- Senior engineer, Mathematical and Algorithmic Sciences Laboratory, Huawei Technologies France, Boulogne-Billancourt, France.
  - January 2020 — July 2020
  - **Responsibility:** Research in convergence of mean shift algorithm, and high dimensional statistics/machine learning: high dimensional nearest neighbor search problem and its application to dimensionality reduction, using concentration of measures. Two preprints.

- Data Scientist, Batvoice Inc., Paris, France.
  - April 2019-July 2019
  - **Responsibility:** building machine learning algorithms using MFC coefficients to separate music and speech in audio segments, as a part of the pipeline of detecting telemarketer or scam calls.

- Postdoctoral scientist in mathematical computer vision, LIX Laboratory, Ecole Polytechnique, Palaiseau, France
  - November 2016 — December 2017

- Postdoctoral scientist in computational neuroimaging, Department of Neurology, University of California, Los Angeles (UCLA), CA, USA

- February 2016-December 2016

- Postdoctoral scientist in computational neuroimaging, Aramis Laboratory, INRIA Paris-Rocquencourt, France
  - October 2014-October 2015

WORK EXPERIENCE II - TEACHING:

At EPITA, Paris as a lecturer: (August 2021-present)

- **Total teaching hours: 540 and ongoing**
- ***Subjects taught and corrected/graded (in English):***

(1) Problem solving sessions (travaux dirigés - TD in French) for *classe préparatoire intégrée* in mathematics for first two years of engineering students. Topics include: calculus, probability, number theory, set theory, logic, sequences, vector spaces, matrices, differential equations, complex numbers.

(2) Delivering lectures (cours magistral - CM) in Probability and Statistics courses in the engineering cycle - both for the first year and third year engineering students, followed by practical classes (travaux pratiques - TP) in programming for the same.

(3) Possibility to teach practical classes (travaux pratiques - TP) Matrix Analysis for Engineers - that I have been offered to teach.

At CEA Study Abroad: (May-June 2022), as a course instructor:

- **Total Teaching hours: 70**
- ***Subject taught and exams corrected/graded (in English):*** Calculus III (Vector algebra, Multivariate Calculus and Vector Calculus)

During my PhD at Rutgers University, NJ, USA: (2007-2013)

- **Total estimated teaching hours: 700**
- ***Subjects taught and graded:*** precalculus, abstract and linear algebra, calculus I(one variable), II(applications), III(several variables), IV (differential equations), probability theory - both finite and continuous.
- Taught classes in the capacity of an instructor and also as a teaching assistant

After obtaining my PhD, as a private tutor/teacher: (2020-present)

- ***i) Pre-university level courses:*** I tutored privately students of several different academic levels for about **5 years in addition. Received excellent recommendations** and **five star ratings** from clients/students and can produce them. This specific tutoring experience covered: **International Baccalaureate**

Mathematics HL (high school level), **A-level and A level further Mathematics, GCSE, MAT (Oxford) and STEP (Cambridge) entrance preparation**

- ***ii) University level courses:*** I tutored for or gave tutorial sessions/lectures in: **real analysis**, **linear algebra**, **probability theory, point-set topology**, **statistics** - especially **inference**, **hypothesis testing** and **regression**.
- ***iii) Other:*** I'm also a TESOL certified instructor in *English as a Second Language (ESL) and have taught a few French students*.

EDUCATION:

- Doctorate (Ph.D.) in Mathematics, Rutgers University, New Brunswick, NJ, USA September 2007 — September 2013. Link to thesis.

- Master of Science (M.Sc.) in Applied Mathematics, Tata Institute of Fundamental Research (TIFR), Bangalore, India
  June 2005 — June 2007

- Bachelor of Science (B.Sc.) in Mathematics with minors in Statistics and Computer Science, Jadavpur University, Kolkata (Calcutta), India
  May 2002 — May 2005

LIST OF PUBLICATIONS AND PREPRINTS:

- **Articles in pure mathematics (differential geometry and Teichmüller theory)**

  1. Construction of a closed hyperbolic surface of arbitrarily small eigenvalue of prescribed serial number. Susovan Pal, *Contemporary Mathematics, Vol. 590, 2013.*
  2. Boundary differentiability of Douady-Earle extensions of diffeomorphisms of S^n. Jun Hu, Susovan Pal, *Pure and Applied Mathematics Quarterly, 2013.*
  3. Douady-Earle extensions of Holder continuous and Lipschitz continuous circle homeomorphisms. Jun Hu, Susovan Pal, *Preprint.*

- **Articles in applied mathematics (computational neuroimaging, machine learning using differential geometry):**

  1. A Fanning Scheme for the Parallel Transport Along Geodesics on Riemannian Manifolds. Maxime Louis, Benjamin Charlier, Paul Jusselin, Susovan Pal, Stanley Durrleman. January 2018, SIAM Journal on Numerical Analysis 56(4):2563-2584, DOI: 10.1137/17M1130617

2. A Riemannian Framework for Linear and Quadratic Discriminant Analysis on the Tangent Space of Shapes. Susovan Pal, Roger P. Woods, Shantanu Joshi, Suchit Panjoyar, Elizabeth Sowel, Katherine L. Narr, DOI: 10.1109/CVPRW.2017.102, 2017 IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW). **Best paper award.**

3. L^2energy method for optimal bandwidth estimation to detect topological circularity in high dimensional data. Susovan Pal, Praneeth Veppakomma. *Preprint*. *Link*.

4. On convergence of the Mean Shift algorithms with Gaussian and arbitrary strictly positive definite kernels. Susovan Pal. *Submitted*. *Link to talk*.

5. Equivalent condition for Distance Concentration and Choice of Linear Dimensionality Reduction Maps. Susovan Pal. *Preprint available upon request*.

6. Splintering with distributions and polytopes: Unconventional schemes for private computation. Praneeth Vepakomma, Julia Balla, Susovan Pal, Ramesh Raskar. Preprint. *Link*.

SERVICE TO THE COMMUNITY:

Reviewer for the journal *Computational and Applied Mathematics*, published by Elsevier.

MATHEMATICS/STATISTICS SKILLS:

Geometry and Topology: Riemannian geometry, algebraic topology, point-set topology

Analysis: real analysis, measure theory, functional analysis, Sobolev spaces and distributions, ordinary and partial differential equations

Complex analysis and advanced complex analysis: Complex analysis, hyperbolic geometry, Riemann surfaces, Teichmüller theory

Algebra: Field, Galois and module theory, abstract and linear algebra

Probability, statistics and machine learning: Measure theoretic probability, concentration of measure, aspects of random matrix theory, theory of estimation of parameters, statistical tests-hypothesis testing, inference, supervised and unsupervised learning, manifold learning and dimensionality reduction/manifold learning.

PROGRAMMING PROFICIENCY: Python (basics, NumPy, scikit-learn), MATLAB, LaTeX.

LANGUAGE PROFICIENCY: English (native/bilingual), Bengali (native), French (intermediate), Hindi (notions).

CERTIFICATES: Online course in Machine Learning from Udemy, length: 41 hours, English proficiency certificate (C2) from EF Set, TESOL English instructor certification from International Open Academy.

REFERENCES:

- Prof. Shantanu Joshi, Department of Neurology, University of California at Los Angeles (UCLA). Postdoctoral manager/mentor. Email: s.joshi@g.ucla.edu
- Prof. Feng Luo, Distinguished Professor of Mathematics, Rutgers University, NJ, USA. Doctoral supervisor. Email: fluo@math.rutgers.edu
- Prof. Sara Nadiv Soffer (for teaching): Department of Mathematics, Rutgers University, USA. Teaching supervisor. Email: ssoffer@math.rutgers.edu

HOBBIES: Sports, cooking, listening to music.