

CV – Stanislas PAMELA

BASIC DETAILS

Name : Dr. Stanislas PAMELA
Current position : HPC-Specialist Research Software Engineer
Employer : CCFE – UKAEA
Department : Materials Science & Scientific Computing
Address : D3-1-47, Culham Science Centre
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PERSONAL DETAILS

Date and place of birth : 05/Jan/1986, France
Nationality : French
Gender : M
Civil Status : Married, father of 3
Languages : French (fluent), English (fluent), German (advanced)

PROFESSIONAL CAREER PATH

HPC SPECIALIST RESEARCH SOFTWARE ENGINEER (15/APR/2019 – NOW) :

Area: High-Performance-Computing & Cloud-Computing for Fusion
Employers: UKAEA-CCFE
Assignment location: Culham Science Centre, Abingdon, UK.

RESEARCH PHYSICIST (01/OCT/2013 – 14/APR/2019) :

Area: Numerical Simulation & Theoretical Analysis of
Edge Stability in Tokamak Fusion Plasmas
Employers: UKAEA-CCFE
Assignment location: Culham Science Centre, Abingdon, UK.

POST-DOCTORAL POSITION (15/JUL/2010 – 30/SEPT/2013) :

Position Title: JET Operating Contract (JOC)
Chain1, Chain2 & FLUSH Responsible Officer
Employers: EFDA-JET – CEA – Aix-Marseille Université
Assignment location: JET, Culham Science Centre, Abingdon, UK.

PHD POSITION (01/OCT/2007 – 14/JUL/2010) :

Thesis Title: Magnetohydrodynamic Simulation
of Edge-Localised-Modes in a Tokamak
Employer: Institut de Recherche sur la Fusion Magnétique (IRFM)
CEA Cadarache (FRANCE)
Financing: Agence Nationale de la Recherche (ANR),
Project ASTER, ANR-CIS.2006.001
PhD Supervisor: G.T.A Huysmans (IRFM, CEA Cadarache)
PhD Univ. Supervisor: S. Benkadda (PIIM, Aix-Marseille Université)

EDUCATION

MASTER OF SCIENCE M.SCI. (2003-2007) :

University: Imperial College London - UK
Course Title: Mathematics with a year in Europe
Grade: First Class
Specialization: Mathematical Physics (Phys. Fluids, Waves, Relativity, PDEs)
Algebra (Geometry, Groups & Rings, Algebraic geometry)
Master Thesis: “Simulation of Thin-layer Fluid Flows on Arbitrary Surfaces”

ERASMUS YEAR IN GERMANY (2005-2006) :

University: Humboldt Universität zu Berlin - Germany
Specialization: Mathematics (Algebra, Algebraic geometry)
Grade: First Class

EUROPEAN BACCALAUREATE (2003) :

Institute: European School Culham – Oxfordshire, UK
Courses: Advanced mathematics, Physics, Chemistry, German, Music
Grade: 85%

MUSIC (2002) :

Violin: Grade-8 (UK top qualification before advanced studies)

NOTABLE ACHIEVEMENT

COMPETITIVE INTERNATIONAL PROJECTS AND CONFERENCES :

PI of EUROfusion ENR Project AWP17-ENR-MFE_CCFE-01 (2017-2018)

Title of project : “Understanding the role of reconnection in filament separation and its impact on plasma exhaust in tokamaks”
Total Budget : €534,000, 12.5 person-per-year
Team size : 20 researchers
Institutes involved : CCFE (UK), Manchester University (UK), Warwick University (UK), Aristotle University (Greece), CNR (Italy), CEA (France), Eidhoven University (Netherlands)

PI of PRACE Grant for Tier-0 Supercomputing Resources (2017-2018)

Title of project : “JOREK_MHD: Validation of simulations of MHD instabilities in tokamak plasmas for extrapolation to ITER.”
CPU budget : 30 Million core.hours over 12 months
Team size : 10 researchers
Institutes involved : CCFE (UK), CEA (France), Nice University (France), ITER (IO), IPP Garching (Germany)

Co-Scientific Coordinator of WPJET1 Task T15-02 (2015-2016)

Title: “Pedestal Analysis & Modelling”
Experimental device: Joint European Torus (JET)
Main Scientific Leader: Dr. Costanza Maggi (CCFE-UKAEA)
Team size : 49 Researchers
Institutes involved : EUROfusion associations

Notable Recent Fusion Conference Contributions:

Oral at 42nd European Physics Society EPS-2015 (Lisbon, Portugal)
Oral at 27th IAEA Fusion Energy Conference 2016 (Kyoto, Japan)
Overview at 28th IAEA Fusion Energy Conference 2018 (Ahmedabad, India)

Notable Recent Journal Contributions:

Filamentary plasma eruptions and their control on the route to fusion energy
C.Ham, A.Kirk, S.Pamela, H.Wilson
Nature Reviews Physics volume 2, pages159–167 (2020)
<https://doi.org/10.1038/s42254-019-0144-1>
A Generalised Formulation of G-continuous Bezier Elements Applied to Non-linear MHD
S.Pamela, G.Huijsmans, M.Hoelzl
Journal of Computational Physics 111101 (2022)
<https://doi.org/10.1016/j.jcp.2022.111101>

FIELDS OF EXPERTISE

MACHINE-LEARNING AND ARTIFICIAL INTELLIGENCE :

Supervision of AI/ML researchers :

V.Gopakumar and L.Zanisi (UKAEA staff)
T.James and L.Harris (UKAEA Graduates)
E.Ozturk and E.Lewis (PhD students)

Supervision of AI/ML projects :

Deputy coordinator of FARSCAPE project with supervision of several sub-projects around AI/ML (<https://www.gov.uk/government/news/ukaea-and-hartree-centre-join-forces-to-accelerate-fusion-energy-research-using-advanced-computing>)

Technical projects :

HPC-parallelisation of ML workflows in Tensorflow
Fast-camera image analysis and classification
ML-workflows on novel HPC architectures

HPC AND NUMERICAL DEVELOPMENT :

Yearly CPU consumption on supercomputing clusters : >20 Million core.hours

Cloud Computing : Kubernetes, Spark, Docker, Harbor

Programming : bash, Fortran, C, Python, Latex, Perl, HTML, CSS, PHP, JavaScript, XML, json, HDF5, git, svn, cvs, Matlab, IDL, MDSplus, MPI, openMP

VVUQ: Dakota, VECMA

Non-linear 3D simulation

Open-MPI parallel computing

FEM and mesh-generators

Data visualization (vtk, Paraview)

Synthetic diagnostics for simulations (eg. visible/InfraRed camera, realistic rendering)

Interfacing between programming languages

Web development: built personal “dropbox” (<https://stanstash.com>)

PLASMA PHYSICS IN FUSION DEVICES :

3D non-linear magnetohydrodynamic simulation of fusion plasmas

Pedestal and ELM physics in tokamaks

Tokamak plasma filamentation

Transverse and parallel transport in tokamak Scrape-Off Layer

Quantitative and qualitative validation of simulations against experimental data

MAINTENANCE OF NUMERICAL TOOLS AND DATA-ANALYSIS (2010-2013) :

Chain1/Chain2 : Data-analysis suite on the JET tokamak (~110 diagnostic codes)

Flush / ITM-Flush : Public library to exploit tokamak magnetic equilibria

Surf : Visualisation software for magnetic equilibria and diagnostics on JET

OTHER ROLES AND RESPONSIBILITIES

STUDENTS MANAGEMENT :

Recruitment coordinator for MSc & Undergraduate student placements (2016-2019)

Universities: UK and EU universities

Programs: Summer placements (3 months), Year-in-Industry Scheme (12 months)

Typical number of placements : ~7 Year-in-Industry placements, ~12 Summer placements

Culham PhD Showcase coordinator (2016-2018)

Event : 2-day event for all PhD students affiliated with CCFE across all UK Universities

Universities : UK universities

Typical attendance : 40 PhD students (plus visitors attending open sessions)

STUDENT SUPERVISION AND TUITION :

M.Marshall: PhD at University of York (2021-now) with Prof. H.Wilson
E.Lewis: PhD at University College London (2020-now) with Prof. Y.Andreopoulos
E.Ozturk: PhD at Imperial College London (2020-now) with Prof. A.Ghosh
S.F.Smith: PhD at CCFE (2016-2019) with Prof. H.Wilson
SK.Kim: PhD at Seoul National University, S.Korea (2016-2020)
M.Duff: MSc student (3 months placement in 2014)
A-level student (2 weeks placement in 2014)

REFERENCES AT UKAEA

DR R. AKERS : **POSITION :** HEAD OF ADVANCED-COMPUTING DEPARTMENT
 Email : rob.akers@ukaea.uk
DR C. HAM : **POSITION :** HEAD OF MHD GROUP IN TOKAMAK SCIENCE DEPARTMENT
 Email : christopher.ham@ukaea.uk
DR D. McDONALD : **POSITION :** TOKAMAK SCIENCE DEPARTMENT MANAGER
 Email : darren.mcdonald@ukaea.uk

REFERENCES OUTSIDE UKAEA

DR G. HUIJSMANS : **POSITION :** SENIOR SCIENTIFIC OFFICER AT CEA
 Prof. at Technische Universiteit Eindhoven, Netherlands
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DR J-L THIFFEAULT : **POSITION :** ASSOCIATE PROFESSOR AT UNIVERSITY OF WISCONSIN, USA
 Address : Department of Mathematics, University of Wisconsin
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DR E JOFFRIN : **POSITION :** TASK-FORCE LEADER AT JET TOKAMAK, UK
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