# Theodoros Katsaounis

*Curriculum Vitae*

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## Personal Data

Date-Place of Birth: 1/7/1965, Thessaloniki, Greece

## Current Positions

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| 6/2020–currently | **Professor**, *Dept. of Mathematics & Applied Mathematics*, *Univ. of Crete*, Heraklion Crete, Greece. |
| 9/2002–currently | **Collaborative Faculty Member**, *Institute of Applied and Computational Mathematics(IACM),*, 10/2020–currently: **Member** Scientific Council IACM, FORTH, Heraklion Crete, Greece. |
| 4/2022–currently | **Director**, *Graduate Programme on Data Analysis & Machine-Statistical Learning(DAMSL), organized jointly by University of Crete(Depts. of Math. & Appl. Mathematics and Computer Science) and FORTH(IACM & ICS)*, Heraklion Crete, Greece. |

## Previous Academic Employment

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| 1/2015–1/2020 | **Research Scientist**, *Computer, Electrical & Mathematical Science & Engineering, KAUST*, Thuwal, Saudi Arabia. |
| 8/2009–06/2020 | **Associate Professor**, *Dept. of Mathematics & Applied Mathematics, Univ. of Crete*, Heraklion Crete, Greece. |
| 6/2007–9/2009 | **Assistant Professor with tenure**, *Dept. of Applied Mathematics, Univ. of Crete*, Heraklion Crete, Greece. |
| 3/2003–6/2007 | **Assistant Professor**, *Dept. of Applied Mathematics, Univ. of Crete*, Heraklion Crete, Greece. |
| 9/2001–8/2002 | **Research Fellow**, *Département de Mathématiques et Applications, École Normale Supérieure(ENS)*, Paris, France. |
| 3/1998–8/1998 | **Postdoctoral Researcher**, *Dept. of Mathematics, Univ. of Crete and Institute of Applied and Computational Mathematics (IACM), FORTH*, Heraklion Crete, Greece. |
| 9/1997–2/1998 | **Postdoctoral Fellow**, *Département de Mathématiques et d' Informatique, École Normale Supérieure(ENS)*, Paris, France. |
| 5/1996–8/1997 | **Postdoctoral Researcher**, *Dept. of Mathematics, Univ. of Crete and Institute of Applied and Computational Mathematics (IACM), FORTH*, Heraklion Crete, Greece. |
| 8/1988–8/1994 | **Teaching Assistant**, *Dept. of Mathematics, Univ. of Tennessee*, Knoxville TN, USA. |
| 9/1987–7/1988 | **Research Assistant**, *Institute of Applied and Computational Mathematics (IACM), FORTH*, Heraklion Crete, Greece. |

## Visiting Positions

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| 3/2013–7/2013 | **Visiting Professor**, *Modeling and Scientific Computing(MOX), Politecnico di Milano*, Milano, Italy. |
| 9/2010–2/2011 | **Visiting Professor**, *Institute for Computational and Applied Mathematics, Univ. of Muenster*, Muenster, Germany. |
| 9/1998–3/2003 | **Visiting Professor**, *Dept. of Applied Mathematics, Univ. of Crete*, Heraklion Crete, Greece. |
| 8/2000–12/2000 | **Visiting Professor**, *Dept. of Mathematics, Univ. of Tennessee*, Knoxville TN, USA. |

## Education

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| 1994 | **Ph.D**, *Dept. of Mathematics, Univ. of Tennessee*, Knoxville TN, USA. |
| 1991 | **M.Sc**, *Dept. of Mathematics, Univ. of Tennessee*, Knoxville TN, USA. |
| 1987 | **B.Sc**, *Dept. of Mathematics, Univ. of Crete*, Heraklion Crete, Greece. |

# Administration, Professional Activities

- **Administration: Univ. of Crete, Dept. of Math. & Applied Mathematics & IACM - FORTH**.
  - 2022 – currently: Scientist in charge of the proposal and Director, Graduate Programme on Data Analysis & Machine-Statistical Learning
  - 2020 – currently: Member, Scientific Council IACM, FORTH, Greece
  - 2020 – 2022: Director, Graduate Programme on Applied and Computational Mathematics
  - 2002 – 2023: Member of several committees: IT, Hiring, Undergraduate Program, Internship
  - 9/2011 – 9/2013: Associate Head of Department
  - 9/2011 – 12/2012: Senate Member, University of Crete
  - 9/2007 – 8/2008: Senate Member, University of Crete

- **Organization of Scientific Events**.
  - Workshop on *Mathematical Biology on the Mediterranean Conference-Workshop*, 5/9 - 6/9, 2022, IACM-FORTH, Crete, Greece, (member of the organising committee)
  - Workshop on *Mathematical Biology on the Mediterranean Conference-Summer School*, 29/8 - 2/9, 2022, IACM-FORTH, Crete, Greece, (member of the organising committee)
  - Workshop on *Modelling of nonlinear dispersive waves: Mathematical theory and numerical approximation*, May 27-29, 2019, Castro Urdiales, Spain, (member of the organising committee)
  - Conference on *Nonlinear Partial Differential Equations in the Applied Sciences*, November 27-30, 2018, KAUST, Thuwal, Saudi Arabia, (member of the organising committee)
  - *Minisymposium on Numerical Methods for P.D.E's, part of "ACMAC's International Conference on Applied Mathematics"*, September 16–20, 2013, Heraklion, Greece, (organiser)
  - *Scientific and High Performance Computing*, January 14–18, 2013, Heraklion, Greece, (member of the organising committee)
  - *Cell biology and physiology: PDE models*, October 4–6, 2012, Heraklion, Greece, (member of the organising committee)
  - *Discontinuous Galerkin Methods for Partial Differential Equations*, September 26–28, 2011, Heraklion, Greece, (member of the organizing committee)

- **Review work**.
  - Reviewer: *SIAM J. of Numerical Analysis*, *SIAM J. of Scientific Computing*, *Journal of Computational Physics*, *IMA Journal of Numerical Analysis*, *Mathematical Modeling and Numerical Analysis (M2AN)*, *Applied Numerical Mathematics*, *Applied Mathematics and Computations*, *AMS-Mathematical Reviews/MathSciNet* , *Int. J. for Numerical Methods in Fluids*, *Journal of Computational and Applied Mathematics*, *Mathematical Methods in Applied Sciences*, *Numerical Methods for Partial Differential Equations*, *IEEE Journal of Photovoltaics*, *Renewable Energy*

# Research Interests

- **Data science and computational modelling**.
  - Statistical modelling for solar energy applications.
  - Statistical modelling for gene transcription
  - Neural networks for pde's
  - Optimization algorithms for elastodynamics

- **Adaptive methods for evolutionary problems**.
  - Error control driven algorithms, aposteriori estimates.
  - Analysis, evaluation and implementation of adaptive algorithms, convergence.
  - Space-time adaptivity

- **Wave propagation**.
  - Dispersive wave models
  - Water waves propagation models
  - Computational methods for linear and nonlinear elastodynamics
  - Computational methods for dispersive wave equations
  - Linear and non-linear Schrödinger models

- **Fluid Mechanics**.
  - DG methods for Navier-Stokes
  - Shallow water waves models
  - Numerical methods for conservation laws
  - Implementation of robust and efficient solvers for Navier-Stokes

- **Solar Cells**.
  - Mathematical modelling for various solar cell architectures.
  - Computational methods for solar cell simulation.
  - Machine learning algorithms for energy yield prediction of PV installations

## Funded Research projects, Grants (last 10 years)

**2023-2025** **Modeling Transcription: an integrated approach to understand cancer-specific gene expression programs**, *Funded by: HFRI(ELIDEK), Greece*, An interdisciplinary project between IMBB and IACM FORTH, with total budget of €420.000. I am the PI of the IACM team with budget of €130K. Develop mathematical models for DNA transcription targeting cancer related genes.

**2020-2022** **Machine Learning, Statistical Modelling and Uncertainty Quantification for PV Performance Output Prediction**, *Funded by: Saudi ARAMCO, Saudi Arabia*, Developed at IACM-FORTH with budget of $160.000 and I was the PI of the project. Development and evaluation of machine learning algorithms for forecasting energy yield output in PV installations..

**2018-2019** **Energy yield assessment of high efficiency c-Si PV technologies for the local climate**, *Funded by: Saudi ARAMCO, Saudi Arabia*, Developed at CEMSE-KAUST with budget of $150.000 and I was the Co-PI of the project. Develop and evaluate the efficiency of various PV architectures for the Arabian peninsula.

**2017-2021** **Performance evaluation of a solar cell simulator in HPC environment : CRAY XC-40 "Shaheen" (2M Core Hours)**, *Funded by KAUST Supercomputing Laboratory, Saudi Arabia*, Developed at CEMSE-KAUST with budget of $102.000 and I was the Co-PI of the project. Develop and evaluate a computational framework for solar cell simulation in modern HPC environment.

**2012-2015** **Self adaptive methods for time dependent problems: Algorithms and Analysis(STADAPT)**, *Program "**Excellence**" in research of the Greek Secretariat for Research and Technology*, Developed at IACM-FORTH with budget : €150.000 and I was the Co-PI of the project. Development, analysis and implementation of time-space adaptive algorithms for approximating solutions of evolution pde's.

**2012-2015** **Analysis of discrete, kinetic and continuum models for elastic and viscoelastic materials(DIKICOMA)**, *Program "**Excellence**" in research of the Greek Secretariat for Research and Technology*, Developed at IACM-FORTH with budget of €175.000 and I was a collaborative researcher. Mathematical modelling, analysis and numerical approximation of models describing elastic and viscoelastic materials.

**2012-2015** **Advanced Numerical Techniques for Reaction Diffusion Models in Biology**, *Greek Secretariat for Research and Technology. Developed at IACM-FORTH with budget of €150.000 and I was the scientific advisor(postdoctoral advisor) of the project.*

**2011–2014** **AKAIPRO: Study of extreme weather events in Greece and their consequences in civil protection and the economy**, *Greek Secretariat for Research and Technology*, A joint project between NTUA and IACM-FORTH with total budget: €522.000 and I was Co-PI of the IACM-FORTH team. Evaluation and validation of the WRF model for predicting extreme weather phenomena over Greece.

**2010–2014** **ACMAC : Archimedes Center for Modeling Analysis and Computation(www.acmac.uoc.gr)**, *FP7-REGPOT-2009-1*, Founding member, total budget: €2.590.000, A grant supporting the initiation of a Research Center within the Applied Mathematics Department of the University of Crete (hosting postdoctoral fellows, series of workshops and fostering collaboration with five excellence centers in Europe). I was member of the proposal and steering committees.

## Supervision & Mentoring of Early Stage Researchers

- **Postdocs**.
  - K. Charmpi, 2024-currently, IACM-FORTH, Greece
  - G. Kounadis, 2021-currently, KAUST Saudi Arabia, and IACM-FORTH, Greece
  - I. Kyza, 2012-2013, (currently : Lecturer, Univ. of St. Andrews, UK)
  - Th. Baxevanis, 2005–2008, (currently : Associate Professor, U. of Huston, USA)
  - Ch. Simeoni, 2002–2003, (currently : Maitre de Conference, Univ. Nice, France)

- **Ph.D students**.
  - I. Mousikou, KAUST, Saudi Arabia, 2023, (Co-Advisor)
  - G. Kounadis, 2020, Univ. of Athens, Greece, (Co-Advisor), (currently : Postdoctoral Student at KAUST, Saudi Arabia)
  - I. Kyza, 2009, Univ. of Crete, Greece, (Co-Advisor), (currently : Lecturer at Univ. of St. Andrews, UK)
  - N. Sfakianakis, 2009, Univ. of Crete, Greece, (Co-Advisor), (currently : Lecturer, Univ. of St. Andrews, UK)
  - F. Karakatsani, 2006, Univ. of Crete, Greece, (Co-Advisor), (currently : Assistant Professor, Univ. of Ioannina, Greece )

- **M.Sc students**.
  - ◦ G. Papadomichelakis, 2021, Univ. of Crete, Greece
  - ◦ E. Christofi, 2020, Univ. of Crete, Greece
  - ◦ I. Mousikou, 2016, KAUST, Saudi Arabia
  - ◦ E. Psycharis, 2010, Univ. of Crete, Greece
  - ◦ K. Kafousas, 2006, Univ. of Crete, Greece
  - ◦ V. Stefa, 2005, Univ. of Crete, Greece

## Short term visits(last 5 years)

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| June 2024 | University of St. Andrews, St. Andrews, UK, (1 week) |
| April 2024 | KAUST, Thuwal, Saudi Arabia, (1 week) |
| May 2023 | University of Dundee, Dundee, UK, (1 week) |
| February 2023 | KAUST, Thuwal, Saudi Arabia, (1 week) |
| May 2022 | University of Dundee, Dundee, UK, (1 week) |
| April 2019 | Univ. of Tennessee, USA(1 week) |

## Selected Invited talks(last 5 years)

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| February 2023 | AMCS Colloquium, KAUST, Thuwal, Saudi Arabia |
| September 2021 | Numerical Methods for Evolution Equations, IACM - FORTH, Heraklion, Greece |
| September 2019 | EUPVSEC 2019, Marseille, France |
| September 2019 | DEA 2019, Krakow, Poland |
| April 2019 | Dept. of Math. Colloquium, Univ. of Tennessee, Knoxville, USA |
| March 2019 | FEF 2019, Chicago, USA |

## Teaching Experience

### Dept. of Mathematics, Univ. of Tennessee, USA

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| 1988–1994 | Courses taught include : Precalculus, Calculus I,II,III, Linear Algebra, Ordinary Differential Equations, Numerical Analysis |

### Dept. of Math. & Applied Mathematics, Univ. of Crete, Greece

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| 1997– 2024 | I have taught continuously several undergraduate and graduate courses including: *Introduction to UNIX and the FORTRAN, C and Python programming languages, Calculus I, Linear Algebra I, Analysis I, Numerical Analysis, Functional Analysis, Numerical Algorithms, Numerical methods for ODE's, Numerical methods for PDE's, Numerical simulation and applications, Numerical Linear Algebra, Parallel Processing, Computational Fluid Dynamics, Scientific Computing, Mathematics of Machine Learning* |

## Research Highlights, Key Publications

My research focuses on the field of Applied and Computational Mathematics, with emphasis on the design, analysis, and implementation of advanced numerical methods for solving various types of partial differential equations (PDEs) that model a wide range of physical processes. Key application areas include Computational Fluid Dynamics, Conservation Laws, Advection-Reaction-Diffusion systems in Biology, Shear Band formation in metals, Linear and Nonlinear Schrödinger equations, Dispersive Wave propagation, as well as Solar Cell Simulations and Energy Yield Predictions for PV installations. These research contributions have been published in leading journals in the field, highlighting both theoretical advancements and real-world applications. Lately, my interests have also expanded to *Data-Driven Computational Modeling*, which is the main focus of my most recent research efforts and the core of my last two funded grants. This includes the development of machine learning algorithms and statistical models for applications such as energy yield forecasting and modeling biological processes, reflecting a growing emphasis on integrating data-driven approaches with traditional computational methods.

### Schrödinger type models

In [**J34**] we introduce an new optimal order, structure preserving, computational efficient scheme for the numerical approximation of the Schrödinger-Poisson system. Further, in papers [**J22**] and [**J28**] we proved, for the first time in the literature, optimal a-posteriori estimates for the relaxation Crank-Nicolson Finite Element method for linear and nonlinear Schrödinger equation. Based on these estimates we design and implement a space-time adaptive algorithm.

### Localization in metals

In [**J5**] we provided a detailed numerical investigation of shear bands at high strain-rate deformations of metals using a space-time adaptive algorithm, while in [**J17**] we first to develop a quantitative criterion determining the onset of localization and shear band formation at high strain-rate deformations of metals. A complete characterization of the formation of coherent structures typically observed in shear localization in solid mechanics is provided in [**J25**]. In [**J29**] we investigate the formation of shear bands during high-speed shear deformation in metals. Self-similar localizing solutions are derived through geometric singular perturbation theory, transforming the problem into constructing a heteroclinic orbit for a fast-slow dynamical system.

### Dispersive waves

In [**J19**], [**J21**] we first apply successfully the finite volume method for the numerical simulation of dispersive water wave propagation. In [**J32**], a new Boussinesq type water wave model is derived, where slip-wall boundary conditions on finite domain are straightforward to implement. The new system is proved to be well-posed and an analysis of the finite element method applied for its discretization is presented. Recently in [**J37**] we developed a new structure preserving, optimal order scheme for the numerical approximation of a Schrödinger equation modelling wind-forced ocean waves.

### Solar cells

In [**J26**], [**J30**] we develop new mathematical models for modelling the operation of solar cells. Various architecture and designs are tested and numerical simulations are compared directly with experimental data. In [**J35**], we develop a series of statistical - machine learning methodologies/algorithms for the day-ahead energy yield forecasting of PV installations. Further results are presented in a series of conference proceeding papers, [**P17**]-[**P21**].

### Balance laws, Fluid mechanics

[**J1**] is one of the first studies on the application of a locally divergence-free DG fully discrete method to the incompressible Navier-Stokes system. A fully analysis is proved and several numerical simulations are presented, see also [**J13**]. The finite element method is applied to the relaxation approximation of general balance laws in [**J5**] and space adaptivity provides the necessary stabilizing mechanism. In [**J3**], we consider finite volume relaxation schemes for multidimensional scalar conservation laws. These schemes are constructed by appropriate discretization of a relaxation system and it is shown to converge to the entropys olution of the conservation law with rate $h^{1/4}$. These class of schemes were applied in the case of the Shallow-Water system in [**J7**] and [**J12**] for 1D and 2D cases respectively, providing a new robust alternative solver for these models. Recently in [**J36**] we derive explicit solutions of axis-symmetric flows modelled by the Euler system and we show that, under certain conditions, stationary self-similar solutions of the axisymmetric Navier–Stokes equations converge to stationary self-similar solutions of the axisymmetric Euler equations as the viscosity tends to zero ($\nu \to 0$).

## Publications

### Journal Publications

J37 *Efficient numerical approximations for a nonconservative nonlinear Schrödinger equation appearing in wind-forced ocean waves* (with A. Athanassoulis and I. Kyza), Studies in Applied Mathematics, vol.153, no.4, 2024

J36 *Axisymmetric Flows with Swirl for Euler and Navier–Stokes Equations* (with I. Mousikou and A. Tzavaras), Journal of Nonlinear Science, vol. 34, no. 86, 2024

J35 *Robust day-ahead solar forecasting with endogenous data and sliding windows*, (with Kamarianakis, Y., Pantazis, Y., Kalligiannaki, E., Kotsovos, K., Gereige, I., Abdullah, M., Jamal, A., Tzavaras, A.), Journal of Renewable and Sustainable Energy, vol.16, no. 2, 2024

J34 *A novel, structure preserving, second order in time relaxation scheme for the Schrödinger-Poisson system*, (with A. Athanassoulis, I. Kyza and S. Metcalfe), J. Computational Physics(JCP), vol.490, 112307, 2023

J33 *A posteriori error estimators for discontinuous Galerkin method for diffusion problems, based on the hypercircle method*, (with D. AlSheikh), Arabian Journal of Mathematics, 2022

J32 *A regularized shallow-water waves system with slip-wall boundary conditions in a basin: theory and numerical analysis*, (with S.Israwi, H. Kalisch, and D. Mitsotakis), Nonlinearity, vol.35, no.1, pp.750-786, 2022

J31 *Boussinesq-Peregrine water wave models and their numerical approximation*, (with D. Mitsotakis and G. Sadaka) Journal of Computational Physics, vol.417, 109579, 2020

J30    *Performance evaluation of bifacial c-Si solar cells under actual conditions through 2D device simulations and outdoor measurements*, (with K. Kotsovos, I. Gereige, A. Basaheeh, M. Abdullah, A. Khayat, E. Al-Habshi, A. Al-Saggaf and A. Tzavaras), Renewable Energy, vol.143, pp. 1285-1298, 2019

J29    *Localization in adiabatic shear flow via geometric theory of singular perturbations*, (with M-G. Lee, and A. Tzavaras), Journal of Nonlinear Science, 2019

J28    *A posteriori error analysis for evolution nonlinear Schrödinger equations up to the critical exponent*, (with I. Kyza), SIAM J. Numerical Analysis(SINUM), vol.56, no.3, pp.1405-1434, 2018

J27    *On the reflection of solitons of the nonlinear Schrödinger equation* (with D. Mitsotakis), Mathematical Methods in the Applied Sciences, vol.41, no.3, pp.1013-1018, 2018

J26    *2D simulation and performance evaluation of bifacial rear local contact c-Si solar cells under variable illumination conditions*, (with K. Kotsovos, I. Gereige, A. Al-Saggaf and A. Tzavaras), Solar Energy, vol.158, no.1, pp.34-41, 2017

J25    *Emergence of coherent localized structures in shear deformations of temperature dependent fluids*, (with A.Tzavaras and J. Olivier), Archive for Rational Mechanics and Analysis(ARMA), vol.224, no.1, pp.173-208, 2017

J24    *Localization in inelastic rate dependent shearing deformations* (with M-G. Lee and A. Tzavaras), Journal of the Mechanics and Physics of Solids(JMPS), vol.98, no.1, pp.106-125, 2017

J23    *Regularized semiclassical limits: linear flows with infinite Lyapunov exponents* (with A. Athanassoulis and I. Kyza), Communications in Mathematical Sciences(JCMS), vol. 14, no.7, pp.1821-1858, 2016

J22    *Aposteriori error control and adaptivity for Crank-Nicolson finite element approximations for the linear Schrödinger equation*(with I. Kyza), Numerische Mathematik, vol.129, no.1, pp.55-90, 2015

J21    *Finite volume methods for unidirectional dispersive wave models*, (with D. Dutykh and D. Mitsotakis), International Journal for Numerical Methods in Fluids(IJNMF), vol.71, pp.717-736, 2013

J20    *Three-points interfacial quadrature for geometrical source terms on nonuniform grids*, (with C. Simeoni), Calcolo, vol.49, no.3, pp.149-176, 2012

J19    *Finite volume schemes for dispersive wave propagation and runup*, (with D. Dutykh and D. Mitsotakis), Journal of Computational Physics(JCP), vol. 230, no.8, pp.3035-3061, 2011

J18    *Adaptive finite element computations of shear band formation* (with Th. Baxevanis, A. Tzavaras), Mathematical Models Methods In Applied Sciences (M3AS), vol.20, no.3, pp.423-448, 2010

J17    *Effective equations for localization and shear band formation* (with A. Tzavaras), SIAM Journal on Applied Mathematics(SIAP), vol. 69, no. 6, pp. 1618-1643, 2009

J16    *Scaling of the size and temporal occurrence of burst sequences in creep rupture of fiber bundles* (with Th. Baxevanis), European Physical Journal B, vol.61, no.2 pp.153-157, 2008

J15    *Burst avalanches and inter-occurrence times in creep rupture* (with Th. Baxevanis), Europhysics Letters, vol.81, 24001, 2008

J14    *Load capacity and peak displacement in viscoelastic fiber bundles* (with Th. Baxevanis), Physical Review E, vol.75, 046104, 2007

J13    *Numerical simulation of incompressible fluid flow using locally solenoidal elements* (with O. Karakashian), Computers and Mathematics with Applications(CMA), vol.51, no.9-10, pp.1551-1570, 2006

J12    *Numerical solution of the two-dimensional shallow water equations by the application of relaxation methods*, (with A.I. Delis), Applied Mathematical Modelling, vol.29, no.8, pp.754-783, 2005

J11    *First and Second order Estimates for the Upwind Source at Interface Method*, (with C. Simeoni), Mathematics of Computation, vol.74, no. 249, pp.103-122, 2005

J10    *A generalized relaxation method for transport and diffusion of pollutant models in shallow water*, (with A.I. Delis), Computational Methods in Applied Mathematics(CMAM), vol.4, no.4, pp.410-430, 2004

J9    *Upwinding sources at interfaces in conservation laws* (with B. Perthame, C. Simeoni), Applied Mathematics Letters(AML), vol.17, pp. 309-316, 2004

J8    *High Frequency Waves near Cusp Caustics* (with E. Kalligianaki, G. Makrakis), Quarterly of Applied Mathematics, vol. LXI, no.1, pp. 111-129, 2003

J7    *Relaxation schemes for the shallow water equations* (with A. Delis), International Journal for Numerical Methods in Fluids(IJNMF), vol. 41, no.7, pp. 695-719, 2003

J6    *High frequency limit of Helmholtz equations* (with JD. Benamou, F. Castela, B. Perthame), Revista Matematica Iberoamericana, vol.18, no.1, pp.187-209, 2002

J5   *Adaptive Finite Element Relaxation Schemes for Hyperbolic Conservation Laws* (with Ch. Arvanitis, Ch. Makridakis), Mathematical Modelling and Numerical Analysis,(M2AN), vol.35, no.1, pp.17-34, 2001

J4   *Computation of High Frequency Fields near Caustics* (with G. Kosioris, G. Makrakis), Mathematical Models and Methods in Applied Sciences (M3AS), vol.11, no.2, pp.199-228, 2001

J3   *Finite volume relaxation schemes for the multidimensional conservation laws* (with Ch. Makridakis), Mathematics of Computation, vol.70, no.234, pp.533-553, 2001

J2   *Modified structured central schemes for 2D hyperbolic conservation laws* (with D.Levy), Applied Math. Letters(AML) vol.12, no.6, pp.89-96, 1999

J1   *Fully discrete nonconforming finite element schemes for the non-stationary Navier–Stokes equations*, Journal of Numerical Mathematics(formerly East-West Journal of Numerical Mathematics) vol.6, no.4, pp.273-298, 1998

## Conference Proceedings(Referreed)

P22  *Self-similar axisymmetric flows with swirl* (with I. Mousikou and A. Tzavaras), Proceedings HYP2022: Theory, Numerics and Applications of Hyperbolic Problems, 2024

P21  *Day-Ahead Forecasting of Solar Irradiance & PV Power Output Through Statistical Machine Learning Methods*, (with Kamarianakis, Y., Pantazis, Y., Kalligiannaki, E., Kotsovos, K., Gereige, I., Abdullah, M., Jamal, A., Tzavaras, A.), Proceedings Smart Grid (SASG), Saudi Arabia, 2022

P20  *KNN-Based Ensembles for Day-Ahead Forecasting of Solar Power Outputs*, (with Y. Pantazis, E. Kalligiannaki, Y. Kamarianakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Jamal, A. Tzavaras), Proceedings of EuroSun2022, Kassel, Germany, 2022

P19  *Efficiency Evaluation and Comparisons of Solar Cell Technologies Based on Measurements from the Arabian Peninsula*, (with Y. Pantazis, E. Kalligiannaki, Y. Kamarianakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Jamal, A. Tzavaras), Proceedings of EuroSun2022, Kassel, Germany, 2022

P18  *Performance Evaluation and Comparison of Solar Cell Technologies Based on Historical Data* , (with Y. Pantazis, E. Kalligiannaki, Y. Kamarianakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Tzavaras), Proceeding of 39th European Photovoltaic Solar Energy Conference and Exhibition(EUPVSEC2022), 8th World Conference on Photovoltaic Energy Conversion(8th WCPEC), pp. 691-694, 2022)

P17  *Day Ahead Forecasting of Solar Irradiance: KNN-Based Ensembles* , (with Y. Kamarianakis, Y. Pantazis, E. Kalligiannaki, K. Kotsovos, I. Gereige, M. Abdullah, A. Tzavaras),Proceeding of 39th European Photovoltaic Solar Energy Conference and Exhibition(EUPVSEC2022), 8th World Conference on Photovoltaic Energy Conversion(8th WCPEC), pp.1248-1252, 2022)

P16  *Estimating Solar Cell Operating Temperature via Deep Neural Networks* , (with G. Papadomichelakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Jamal and A. Tzavaras), Proceeding of 39th European Photovoltaic Solar Energy Conference and Exhibition(EUPVSEC2022), 8th World Conference on Photovoltaic Energy Conversion(8th WCPEC), pp. 629-631, 2022)

P15  *Seasonal Performance Assesment of Various PV Technologies in a Desert Climate Through Device Simulations and Outdoor Measurements* (with K. Kotsovos, I. Gereige, A. Basaheeh, M. Abdullah, A. Khayat, E. Al-Habshi, A. Al-Saggaf, and A. Tzavaras), Proceeding of 37th European Photovoltaic Solar Energy Conference and Exhibition(EUPVSEC2020), pp.1112 - 1116, 2020

P14  *Performance Assessment of various PV module types under desert conditions through device simulations and outdoor measurements* (with K. Kotsovos, I. Gereige, A. Basaheeh, M. Abdullah, A. Khayat, E. Al-Habshi, A. Al-Saggaf, and A. Tzavaras),  Proceeding of 36th European Photovoltaic Solar Energy Conference and Exhibition(EUPVSEC2019), pp.874-879, 2019

P13  *Localization of Adiabatic Deformations in Thermoviscoplastic Materials* (with M-G. Lee and A. Tzavaras),  Proceedings HYP2016 : Theory, Numerics and Applications of Hyperbolic Problems II, pp.269-280, Springer, 2018

P12  *On of the Performance of the WRF Numerical Model over Complex Terrain on a High Performance Computing Cluster*, (with N. Christakis, G. Kossioris and M. Plexousakis), Proceedings of High Performance Computing and Comminications (HPCC), Paris, France, 2014

P11  *Dispersive wave runup on non-uniform shores*, (with D. Dutykh and D. Mitsotakis),Finite volumes for complex application VI – Problems & Perspectives. Springer Proceedings in Mathematics, vol.4, pp.389 - 397, 2011

P10  *Finite volume schemes for Boussinesq type equations*, (with D. Dutykh and D. Mitsotakis), Proceedings of Colloque EDP-Normandie, Caen, France, pp.15-21, 2011

P9   *Localization and shear bands in high strain rate plasticity*, (with A. Tzavaras), IMA Proc. on "Nonlinear Conservation Laws and Applications", vol.153, pp.365-378, 2010

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