

# Savvas Raptis

Curriculum Vitae



## PERSONAL DETAILS

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	8/7/1991
	Stockholm, Sweden
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	AAZ-9063-2020






## EDUCATION

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- 2022 **PhD. Space and Plasma Physics (240 ECTS)**  
*KTH Royal Institute of Technology, School of Electrical Engineering, Division of Space and Plasma Physics (SPP) - Alfvénlaboratoriet*  
Topic: "Investigation of high-speed jets and related phenomena in Earth's magnetoseath"
- 2018 **MSc. Astronomy and Astrophysics (120 ECTS)**  
*KU Leuven, Department of Physics and Astronomy, The Institute of Astronomy (IVS), Department of Mathematics, Centre for mathematical Plasma Astrophysics (CmPA)*  
Thesis: "Processing Solar Images to Forecast Coronal Mass Ejections using Artificial Intelligence"  
Download (English): 
- 2016 **BSc. (Hons.) Physics (240 ECTS)**  
*National and Kapodistrian University of Athens, Faculty of Physics*  
Thesis: "Solar Energetic Particles: A study of their properties through measurements from ESA's SREM instrument."  
Download (Greek): 

## TEACHING EXPERIENCE

Full Description & Examples: 

- 2019 – Now **Teaching Assistant(TA) & Lecturer**  
*KTH, Royal Institute of Technology*  
2021 - Now: Guest Lecturer & TA | Space Physics I Master course (EF2240)   
2020 - Now: TA | Electrical Circuit Analysis, Extended course (EI1110)   
2020 - 2021: TA | Space Physics I Master course (EF2240)   
2019 - Now: TA | L<sup>A</sup>T<sub>E</sub>Xworkshop   
2019 - 2020: TA | Electrodynamics course (EI2405) 
- 2013 – 2015 **Teacher - Mechanics/Oscillations/Waves (High School)**  
*City of Athens, Social Tuition Center of City of Athens*

Assisting High school students with their studies in school and preparing them for the Panhellenic National examinations to proceed to higher education.

## SCIENTIFIC REVIEWING, EDITING & SERVICE

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2021 – Now

### MMS Scientist In The Loop (SITL)

*KTH, Royal Institute of Technology*

SITL service work for the NASA MMS team for orbits: 1181 - 1183, 1204 - 1206, 1248 - 1250, 1284-1285

2021 – Now

### Journal Reviewer




*Journal of Geophysical Research : Space Physics & Radio Science*



More information: Publons Profile [🔗](#)



## PUBLICATIONS


 = Abstract |  = PDF |  = Powerpoint |  = Video



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- 2022 [13] Pollock, C., Chen, L.-J., Schwartz, S., Wang, S., Avakov, L. A., Burch, J. L., Gershman, D. J., Giles, B. L., **Raptis, S.**, & Russell, C. T. (2022). Dynamics of Earth's bow shock under near-radial interplanetary magnetic field conditions. *Physics of Plasmas*, (**Under Review**)
- [12] Lindberg, M., Vaivads, A., **Raptis, S.**, Lindqvist, P.-A., Giles, B. L., & Gershman, D. J. (2022). Electron kinetic entropy across quasi-perpendicular shocks. *Entropy*, (**Under Review**)
- [11] Karlsson, T., Trollvik, H., **Raptis, S.**, Nilsson, H., & Hadi Madanian (2022). Solar wind magnetic holes can cross the bow shock and enter the magnetosheath. *J. Geophys. Res - Space Physics*, (**Under Review**)
- [10] **Raptis, S.**, Karlsson, T., Vaivads, A., Pollock, C., Plaschke, F., Johlander, A., Trollvik, H., & Lindqvist, P.-A. (2022). Downstream high-speed plasma jet generation as a direct consequence of shock reformation. *Nature Communications*. 13, 598 <https://doi.org/10.1038/s41467-022-28110-4> | [🔗](#) 
- **Highlighted:** Focus - Astronomy and planetary science: [🔗](#)  
- **News:** KTH [🔗](#), [phys.org](#) [🔗](#)  
- **Behind The Paper:** Nature Portfolio [🔗](#)
- 2021 [9] Sigiava, A.-G., **Raptis, S.**, Anastasiadis, A. A., Tsigkanos, A., Sandberg, I., Papaioannou, A., Papadimitriou, C., Jiggins, P., Aran, A., & Daglis, I.A. (2021). Solar Energetic Particle Event occurrence prediction using Solar Flare Soft X-ray measurements with Machine Learning. *Journal of Space Weather and Space Climate (JSWSC)*, 11, 59 <https://doi.org/10.1051/swsc/2021043> | [🔗](#) 
- [8] Karlsson, T., **Raptis, S.**, Trollvik, H., & Nilsson, H. (2021). Classifying the magnetosheath behind the quasi-parallel and quasi-perpendicular bow shock by local measurements. *Journal of Geophysical Research: Space Physics*, 126, e2021JA029269. doi: 10.1029/2021JA029269 | [🔗](#) 
- [7] Katsavrias, C., **Raptis, S.**, Daglis, I. A., Karlsson, T., Georgiou, M., & Balasis, G. (2021).



On the generation of Pi2 pulsations due to plasma flow patterns around magnetosheath jets. *Geophysical Research Letters*, 48, e2021GL093611. doi:10.1029/2021GL093611 |  



- [6] Kajdič, P., **Raptis, S.**, Blanco-Cano, X., & Karlsson, T. (2021). Causes of jets in the quasi-perpendicular magnetosheath. *Geophysical Research Letters*, 48, e2021GL093173. doi:10.1029/2021GL093173 |  

- [5] Palmroth, M., **Raptis, S.**, Suni, J., Karlsson, T., Turc, L., et al., (2020). Magnetosheath jet evolution as a function of lifetime: global hybrid-Vlasov simulations compared to MMS observations. *Ann. Geophys.*, doi: 10.5194/angeo-2020-49 |  

- 2020 [4] Battarbee, M., Blanco-Cano, X., Turc, L., Kajdič, P., Johlander, A., Tarvus, V., Fuselier, S., Trattner, K., Alho, M., Brito, T., Ganse, U., Pfau-Kempf, Y., Akhavan-Tafti, M., Karlsson, T., **Raptis, S.**, Dubart, M., Grandin, M., Suni, J., and Palmroth, M. (2020), Helium in the Earth's foreshock: a global Vlasov survey. *Ann. Geophys.*, 38, 1081–1099, doi: 10.5194/angeo-38-1081-2020 |  



- [3] **Raptis, S.**, Karlsson, T., Plaschke, F., Kullen, A., & Lindqvist, P.-A. (2020). Classifying magnetosheath jets using MMS: Statistical properties. *Journal of Geophysical Research: Space Physics*, 125, e2019JA027754. doi:10.1029/2019JA027754 |  




- [2] **Raptis, S.**, Amini-Ragha-Giamini, S., Karlsson, T., & Lindberg, M. (2020). Classification of Magnetosheath Jets using Neural Networks and High Resolution OMNI (HRO) data. *Machine Learning in Heliophysics* Front. Astron. Space Sci. - Space Physics, doi: 10.3389/fspas.2020.00024 |  




- [1] Yordanova, E., Vörös, Z., **Raptis, S.**, & Karlsson T. (2020). Current Sheet Statistics in the Magnetosheath. *Front. Astron. Space Sci. - Space Physics*, doi: 10.3389/fspas.2020.00002 |  





## SELECTED PRESENTATIONS





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- 2022 “Magnetosheath jet generation due to shock reformation” *MMS SWT Tag-up Tuesday Meetings* Online, Virtual. (talk) |  



- 2021 “Super-magnetosonic Downstream Jet Formation as a Direct Consequence of Shock Reformation” *AGU 2020 Fall meeting (AGU2020)* New Orleans, December 13-17, 2021. (poster) |   





“Characterization of the Earth's Magnetosheath and its Fast Plasma Flows Using Upstream Measurements and Machine Learning” *Asia Oceania Geosciences Society (AOGS) 18th Annual Meeting* Online, August 1-8, 2021. (virtual talk) |   



“Magnetosheath Jets Close to the Bow Shock: Generation Mechanisms Using MMS” *The 15th Hellenic Astronomical Conference* Patras, Greece, July 5- 8 , 2021. (talk) |    



“Fast Plasma Flows Downstream of the Bow Shock Using MMS: Correlations and Generation Mechanisms” *EGU2021* Vienna, Austria, April 19 - 30, 2021. (Virtual PICO) |    

“Differentiating Between Convective and Nested Structures With a Single Spacecraft”



*Swedish Space Plasma Meeting 2021* Kiruna, Sweden, February 1 - 2, 2021. (talk) |  



“Magnetosheath jets using MMS: classification and generation mechanisms” *43rd COSPAR Scientific Assembly (COSPAR2021)* Sydney, Australia, January 28 - February 04, 2021. (talk) |    

“Magnetosheath Jets Close to the Bow Shock | Generation Scenarios using MMS” *mini-GEM - Collisionless Shock Group* Online January 19, 2021. ( **Virtual invited talk**) |  



“Investigation of Different Types of Magnetosheath jets and Their Origin using MMS” *mini-GEM - Dayside Kinetic Group* Online January 19, 2021. ( **Virtual invited talk**) |  



2020




“Investigation of Different Types of Magnetosheath Jets and their Origin using MMS” *AGU 2020 Fall meeting (AGU2020)* San Francisco, US, December 01-12, 2020. ( *Virtual talk*) |    


“Jets Downstream of Quasi-parallel and Quasi-perpendicular Bow Shock” *MMS FALL SWT 2020* Online October 08, 2020. ( *Virtual talk*) |  




2019


“Classification of Magnetosheath Jets using Neural Networks, Solar Wind Observations and High-resolution IMF Measurements” *Sixteenth European Space Weather Week (ESWW16)* Liege, Belgium, November 18-22, 2019. (poster) |  

“Creation & Classification of Magnetosheath Jet Database using Magnetospheric Multiscale (MMS) mission” *Sixteenth European Space Weather Week (ESWW16)* Liege, Belgium, November 18-22, 2019. (poster) |  

“Classification of Magnetosheath Jets using Neural Networks and High Resolution OMNI (HRO) data” *Machine Learning in Heliophysics* Amsterdam, Netherlands, September 16-20, 2019. (talk) |   




“Deep Learning Applications in Space & Solar Physics” *Solar Physics Summer School at Raman Science Center* Leh, India, June 10-16, 2019. (poster) | 

“Investigation of Quasi-parallel & Quasi-perpendicular Magnetosheath Jets Using Magnetospheric Multiscale (MMS)” *EGU General Assembly 2019* Vienna, Austria, April 7-12, 2019. (talk) |   

“Difference between Quasi-parallel & Quasi-perpendicular Magnetosheath Jets Using MMS” *SRS (Svenska Rymdforskarens Samarbetsgrupp) 2019* Gothenburg, Sweden, March 14-15, 2019. (poster) | 

“Quasi-parallel & Quasi-perpendicular Magnetosheath Jets Using MMS” *Swedish Space Plasma Meeting 2019* Uppsala, Sweden, February 7-8, 2019. (talk) |  

2018

“Processing Solar Images to forecast Coronal Mass Ejections using Artificial Intelligence” *Fifteenth European Space Weather Week (ESWW15)* Leuven, Belgium, November 5-9, 2018. (poster) |   

## SEMINARS

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"Downstream high-speed plasma jet generation as a direct consequence of shock reformation", *IRF Uppsala Seminars* [🔗](#) Uppsala University, Uppsala, Sweden, 16 March, 2022. | [📄](#) [📺](#) [📖](#)

"Magnetosheath Jets: Simulations, Data Analysis & Machine Learning", *SpaceCoffee Meetings* [🔗](#) National and Kapodistrian University of Athens, Athens, Greece, 29 January 2020. | [📄](#) [📺](#) [📖](#)

"Classifying Magnetosheath Jets Using MMS: Quasi parallel & Quasi perpendicular Jets", *Third International Vlasiator Science Hackathon* [🔗](#) University of Helsinki, Helsinki, Finland, 21 August 2019. | [📄](#) [📖](#)

"Forecasting CMEs using Image Processing & Neural Networks", *SpaceCoffee Meetings* [🔗](#) National and Kapodistrian University of Athens, Athens, Greece, 19 December 2018. | [📄](#) [📺](#) [📖](#)

## SUMMER SCHOOLS & WORKSHOPS

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2022 **Solar Orbiter School**  
*CCSD, Sète, France*  
Course - Summer School | 30 May – 03 June 2022. [🔗](#)  
Presentation topic: *Downstream high-speed plasma jet generation as a direct consequence of shock reformation*

2021 **Polar Magnetospheric Substorms**  
*UNIS, Svalbard, Norway*  
Course - Winter School | 26 November – 07 December 2021. [🔗](#)  
Presentation topic: *Magnetosheath Jets Formation & Basic Properties using MMS*

**14s Iberian Space Science Summer School**  
*University of Coimbra, Coimbra, Portugal*  
Summer school | 26 – 30 July 2021. [🔗](#)

2020 **Solar-Stellar Connection STFC Summer School**  
*University of Warwick, Warwick, UK*  
Summer school | 14 – 18 September 2020. [🔗](#)  
Presentation topic: *Magnetosheath Jets*

**STFC Introductory Solar System Plasmas Summer School**  
*University of Birmingham, Birmingham, UK*  
Summer school | 24 – 27 August 2020. [🔗](#)

**NASA Heliophysics Summer School**  
*UCAR, Boulder, CO, USA*  
Summer school | 6 - 17 July 2020. [🔗](#)  
Presentation topic: *Magnetosheath Jets using Magnetospheric Multiscale (MMS) Mission*

2019 **Solar Physics Summer School**  
*Raman Science Center, Indian Institute of Astrophysics, Leh, India*  
Summer school | 10 - 16 June 2019. [🔗](#)  
Presentation topic: *Deep Learning Applications in Space & Solar Physics*

2018 **CESRA Summer School**

*Royal Observatory of Belgium, Brussels, Belgium*

Summer school | 10 - 14 September 2018.

Presentation topic: *Forecasting Coronal Mass Ejections using Artificial Intelligence*

2017 **Intensive Week on Numerical Modeling in Astrophysics**

*University of Cologne, Cologne, Germany*

Summer school | 11 - 16 September 2017. [!\[\]\(950a62bbddad88d64435fd35607dfc42\_img.jpg\)](#)

2016 **BCGS Summer School in Physics and Astronomy**

*BCGS, Bad Honnef, Germany*

Summer school | 22 - 26 August 2016. [!\[\]\(e1d6102fe77919492c04879c8450f1f5\_img.jpg\)](#)

Presentation topic: *Is there a quantum computer? The D-Wave controversy*

2015 **Petnica Summer Institute: Astrophysics and Astroparticles**

*Petnica Science Center, Valjevo, Serbia*

Summer school | 24 July - 2 August 2015. [!\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60\_img.jpg\)](#)

Presentation topic: *Limb Darkening*

## **DISTINCTIONS & AWARDS**

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2020 – 2022 **Early Career Scientist – ISSI International Team 465**

*International Space Science Institute, Bern, Switzerland*

Early-career scientist of ISSI team "Foreshocks Across the Heliosphere: System Specific or Universal Physical Processes?" (2019-2022). [!\[\]\(21226b58c700e5231ab98d27101bac58\_img.jpg\)](#)

2016 – 2018 **Student Representative – Committee of Msc. Astronomy and Astrophysics**

*KU Leuven, Leuven, Belgium*

Student representative in the faculty committee of the Master of Astronomy and Astrophysics  
- Permanente Onderwijscommissie (POC).

## **SKILLS**

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<i>Languages</i>	Greek (Native) English (Excellent) French (Good)
<i>Programming</i>	Python, MATLAB, R, C++, Wolfram/Mathematica, IDL, JavaScript, SQL
<i>Software</i>	L <sup>A</sup> T <sub>E</sub> X, git, Inkscape, ParaView, VisIt
<i>ML tools</i>	Tensorflow, Keras, Scikit-learn, Theano, Pytorch, SciANN
<i>Miscellaneous</i>	OpenMP, MPI
<i>Hobbies</i>	Classical Guitar, Fitness, Psychology, Investing

## **REFERENCES**

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**PhD supervisor** | Tomas Karlsson | Royal Institute of Technology, [!\[\]\(21199f22b9d1b26430e2489096a820a5\_img.jpg\) : tomask@kth.se](mailto:tomask@kth.se)

**PhD co-supervisor** | Andris Vaivads | Royal Institute of Technology, [!\[\]\(608bfbc50031d613907ec08333d4afc7\_img.jpg\) : vaivads@kth.se](mailto:vaivads@kth.se)

**Collaborator** | Minna Palmroth | University of Helsinki, [!\[\]\(987606e59d5984b3118f78a58e78d0fb\_img.jpg\) : minna.palmroth@helsinki.fi](mailto:minna.palmroth@helsinki.fi)

**Collaborator** | Ferdinand Plaschke | Technische Universität Braunschweig, [!\[\]\(e4d1dc63d9786686940e8539b20e9d0e\_img.jpg\) : f.plaschke@tu-braunschweig.de](mailto:f.plaschke@tu-braunschweig.de)

**MSc. supervisor** | Giovanni Lapenta | KU Leuven, [!\[\]\(d0f94333c2b73aab8679cc2274b0c801\_img.jpg\) : giovanni.lapenta@kuleuven.be](mailto:giovanni.lapenta@kuleuven.be)

**BSc. supervisor** | Ioannis Daglis | University of Athens, [!\[\]\(cb27e8648a5eb2fbfe0b5a33721d875a\_img.jpg\) : iadaglis@phys.uoa.gr](mailto:iadaglis@phys.uoa.gr)