











# Savvas Raptis

*Curriculum Vitae*




## PERSONAL DETAILS

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 AAZ-9063-2020


## RESEARCH EXPERIENCE

Jun 2023 – Now	<b>Postdoctoral Researcher</b> <i>Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland, USA</i>
Jan 2022 – Apr 2023	<b>Visiting Researcher</b> <i>European Space Agency (ESA) - ESTEC, Leiden, Netherlands</i>
Nov 2022 – May 2023	<b>Postdoctoral Researcher</b> <i>KTH Royal Institute of Technology, Stockholm, Sweden</i>
Oct 2018 – Nov 2022	<b>PhD. Researcher</b> <i>KTH Royal Institute of Technology, Stockholm, Sweden</i>

## EDUCATION

2022	<p><b>PhD. Space and Plasma Physics (240 ECTS/4-year)</b>  <i>KTH Royal Institute of Technology, Stockholm, Sweden</i>  <u>Thesis:</u> "High-speed jets and related phenomena at Earth's bow shock and magnetosheath"  <u>Download (English):</u> <a href="#"></a></p>
2018	<p><b>MSc. Astronomy and Astrophysics (120 ECTS/2-year)</b>  <i>KU Leuven, Leuven, Belgium</i>  <u>Thesis:</u> "Processing Solar Images to Forecast Coronal Mass Ejections using Artificial Intelligence"  <u>Download (English):</u> <a href="#"></a></p>
2016	<p><b>BSc. (Hons.) Physics (240 ECTS/4-year)</b>  <i>National and Kapodistrian University of Athens, Athens, Greece</i>  <u>Thesis:</u> "Solar Energetic Particles: A study of their properties through measurements from ESA's SREM instrument."  <u>Download (Greek):</u> <a href="#"></a></p>

## TEACHING EXPERIENCE


Full Description & Examples: 

2019 – Now

### Teaching Assistant (TA) & Lecturer


*KTH, Royal Institute of Technology*


2022: Guest Lecturer | Collisionless Shocks | PhD course

2022: Guest Lecturer | Space Physics I | Master course (EF2240) 

2021 - 2022: Guest Lecturer & TA | Space Physics I | Master course (EF2240) 

2020 - 2022: TA | Electrical Circuit Analysis | Bachelor course (EI1110) 

2020 - 2021: TA | Space Physics I | Master course (EF2240) 

2019 - 2022: TA | L<sup>A</sup>T<sub>E</sub>Xworkshop | Bachelor course 

2019: TA | Electrodynamics | Bachelor 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 preparation for the Panhellenic national examinations to proceed to higher education.

## SUPERVISION & ADMINISTRATION EXPERIENCE

2023

### Main convener


*European Geophysical Union (EGU)*

Convened, and chaired the session of "Dayside transient phenomena and their effects on planetary magnetospheres" during the European Geophysical Union (EGU) general assembly 2023 

2022 – 2023

### Early Career Advisory Committee

*American Geophysical Union (AGU)*

Member of the Early Career Leadership Advisory Committee (EC-LAC) of the Physics and Aeronomy (SPA) section 

2023 – Now

### Mentor

*European Geophysical Union (EGU)*

Participated as a mentor for the European Geophysical Union (EGU) general assembly 2023 

## SCIENTIFIC REVIEWING, EDITING & SERVICE

2022 – Now

### Grant Proposal Reviewer

- NASA Heliophysics Living with a Star Science (LWS-22) program

2021 – Now

### Journal Reviewer

- Journal of Geophysical Research (JGR): Space Physics - *AGU/Wiley*
- Geophysical Research Letters (GRL) - *AGU/Wiley*
- Annales Geophysicae - *EGU/Copernicus Publications*
- The Astrophysical Journal (ApJ) - *Institute of Physics (IOP)*
- Radio Science - *AGU/Wiley*
- Frontiers in Astronomy and Space Sciences - *Frontiers*
- Journal of Plasma Physics - *Cambridge Press*
- Astrophysics and Space Science - *Springer*
- Advances in Space Research - *Elsevier*
- Remote Sensing - *MDPI*
- Journal of Experimental & Theoretical Artificial Intelligence - *Taylor & Francis*




More information: Web of Science Profile 











2021 – Now







## MMS Scientist In The Loop (SITL)





SITL service work for the NASA MMS team for orbits: 1181 - 1183, 1204 - 1206, 1248 - 1250, 1284 - 1285, 1314 - 1315, 1364 - 1365, 1404 - 1407















## PUBLICATIONS

 = Abstract |  = PDF |  = Powerpoint |  = Video

- 2023 [15] Lindberg, M., Vaivads, A., **Raptis, S.**, & Karlsson, T. (2022). MMS observation of two-step electron acceleration at Earth's bow shock., (**Under Review**)
- [15] Trollvik, H., Karlsson, T., & **Raptis, S.** (2022). Velocity of magnetic holes in the solar wind from cluster multipoint measurements., (**Under Review**)
- 2022 [14] Karlsson, T., Trollvik, H., **Raptis, S.**, Nilsson, H., & Hadi Madanian (2022). Solar wind magnetic holes can cross the bow shock and enter the magnetosheath. *Ann. Geophys.*, 40, 687–699, doi:10.5194/angeo-40-687-2022 |  
- [13] Pollock, C., Chen, L.-J., Schwartz, S., Wang, S., Avannov, 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* 29, 112902 (2022) <https://doi.org/10.1063/5.0089937> |  
- [12] **Raptis, S.**, Karlsson, T., Vaivads, A., Lindberg, M., Johlander, A., & Trollvik, H. (2022). On magnetosheath jet kinetic structure and plasma properties. *Geophysical Research Letters*, 49, e2022GL100678. <https://doi.org/10.1029/2022GL100678> |  
- [11] Lindberg, M., Vaivads, A., **Raptis, S.**, Lindqvist, P.-A., Giles, B. L., & Gershman, D. J. (2022). Electron kinetic entropy across quasi-perpendicular shocks. *Entropy* 24, 745. <https://doi.org/10.3390/e24060745> |  
- [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> |  




- **Springer 2022 Highlight:** Breakthrough Research Highlights: Astronomy: 
- **Editor Highlighted:** Focus - Astronomy and planetary science: 
- **Press Coverage:** KTH , phys.org , spacedaily.com 
- **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 |  




## SEMINARS

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High-speed jets and related phenomena in Earth's bow shock and magnetosheath, Johns Hopkins University Applied Physics Laboratory (JHU/APL), Online, 19 August 2022.   

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 Vlasov 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.   

## SCIENTIFIC PRESENTATIONS




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2023



“Multi-mission observations of a high speed jet associated to a solar wind discontinuity” *EGU2023* Vienna, Austria, April 23 - 28, 2022. (*poster*) |   



“High-speed jets at Earth’s magnetosheath & more” *CGS weekly meetings* Laurel, US, January 18, 2021. (*talk*) |  

2022




“Investigation of magnetosheath jet kinetic structure and plasma moment derivation” *AGU 2022 Fall meeting (AGU2022)* Chicago, US, December 11 - 15, 2022. (*poster*) |   

“On the discrepancies of magnetosheath jet identification and statistical properties due to different temporal resolution and plasma moment derivation” *44th COSPAR Scientific Assembly (COSPAR2022)* Athens, Greece, July 16 - 24, 2022. (*talk*) |  




“Magnetosheath Jets using MMS” *Swedish Space Plasma Meeting 2019* Umeå, Sweden, June 8 - 9, 2022. (*talk*) |  




“High-speed plasma jets generated by the cyclic behavior of the Earth’s bow shock” *Solar Orbiter School 2022* Sete, France, May 30 - June 3, 2022. (*poster*) |  




“Shock Reformation Generating High-speed Magnetosheath Jets” *EGU2022* Vienna, Austria, May 23 - 27, 2022. (*talk*) |   





“High-speed Downstream Plasma Jet Generated due to Shock Reformation” *8th MMS Community Workshop* Daytona Beach, FL, US, May 9-13, 2022. (*talk*) |   



2021

“Super-magnetosonic Downstream Jet Formation as a Direct Consequence of Shock Reformation” *AGU 2020 Fall meeting (AGU2020)* New Orleans, US, 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**) | [📄](#) [📅](#)

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) | [📄](#) [📊](#) [📅](#)

## SUMMER SCHOOLS & WORKSHOPS

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2022

### Solar Orbiter School

*CCSD, Sète, France*

Course - Summer School | 30 May – 03 June 2022. [🔗](#)

Presentation topic: *High-speed plasma jets generated by the cyclic behavior of the Earth's bow*

*shock*

2021

### **Polar Magnetospheric Substorms**

*UNIS, Svalbarad, 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. [🔗](#)

2016

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

*BCGS, Bad Honnef, Germany*

Summer school | 22 - 26 August 2016. [🔗](#)

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. [🔗](#)

Presentation topic: *Limb Darkening*

## **DISTINCTIONS, AWARDS & MERITS**

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2022 – 2024

### **ISSI International Team 555**

*International Space Science Institute, Bern, Switzerland*

Early-career scientist of ISSI team "Impact of Upstream Mesoscale Transients on the Near-Earth Environment". [🔗](#)

2023

### **Outstanding contribution - ESA Cluster mission**




*European Space Agency (ESA) - ESTEC, Leiden, Netherlands*

Recognition of outstanding contribution to the Cluster mission

2019 – 2022 **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?". 

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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*Languages* Greek (Native), English (Excellent), French (Good)

*Programming* Python, MATLAB, R, C++, IDL, JavaScript, SQL

*Software* L<sup>A</sup>T<sub>E</sub>X, git, Inkscape, ParaView, VisIt

*ML tools* Tensorflow, Keras, Scikit-learn, Theano, Pytorch, SciANN

*Miscellaneous* OpenMP, MPI

*Hobbies* Classical guitar, fitness, video games


## REFERENCES

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**PhD supervisor** | Tomas Karlsson | Royal Institute of Technology,  : [tomask@kth.se](mailto:tomask@kth.se)

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

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

**Collaborator** | Minna Palmroth | University of Helsinki,  : [minna.palmroth@helsinki.fi](mailto:minna.palmroth@helsinki.fi)

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

**BSc. supervisor/Collaborator** | Ioannis Daglis | University of Athens,  : [iadaglis@phys.uoa.gr](mailto:iadaglis@phys.uoa.gr)

Last updated: 21/06/2023