

François Mernier, Ph.D.

ESA Research Fellow
(European Space Agency)

European Space Research & Technology Centre (ESTEC)
Keplerlaan 1,
NL-2201 AZ Noordwijk
(The Netherlands)

Phone: +31 71 565 6299

Email: francois.mernier@esa.int

URL: <https://www.francoismernier.com>

(ESA Cosmos: <https://www.cosmos.esa.int/web/personal-profiles/francois-mernier>)

Persons of reference:

- Prof. Jelle S. Kaastra (SRON, The Netherlands) – J.S.Kaastra@sron.nl
- Dr. Matteo Guainazzi (ESA/ESTEC, The Netherlands) – Matteo.Guainazzi@sciops.esa.int
- Dr. Norbert Werner (Masaryk University, Czech Rep.) – werner@physics.muni.cz

Born: June 27, 1989 – Brussels, Belgium

Nationalities: Belgian, French

Current position

ESA Research Fellow, ESTEC (Mentor: Dr. Matteo Guainazzi)
(Noordwijk, The Netherlands)

Past positions

- | | |
|-----------|--|
| 2017-2019 | <i>Postdoctoral Researcher</i> , MTA-Eötvös University (Mentor: Dr. Norbert Werner)
(Budapest, Hungary) |
| 2017-2017 | <i>Postdoctoral Researcher</i> , Leiden University (Mentor: Prof. Jelle S. Kaastra)
(Leiden, The Netherlands) |

Skills

AREAS OF SPECIALIZATION

High-energy astrophysics – X-ray spectroscopy – Clusters/groups of galaxies –
Intracuster medium – Chemical enrichment – *XMM-Newton*

COMPUTING SKILLS

Expert	SPEX • <i>XMM-Newton</i> SAS
Good	UNIX console – BASH – fortran 90 – Python (incl. numpy, scipy, astropy, matplotlib) – L ^A T _E X – XSPEC – HEAsoft – SAO ds9 – <i>Chandra</i> CIAO – Linux – Mac OS
Intermed.	Inkscape – GIMP – C – Windows
Basic	HTML – C++ – IDL – IRAF

LANGUAGES

Fluent	French – English
Intermed.	Dutch

Education

2013-2017	PHD in High-energy Astrophysics, Leiden University/SRON (Leiden/Utrecht, The Netherlands)
2010-2012	MSc in Space Sciences, University of Liège (Liège, Belgium) – <i>Magna Cum Laude</i>
2007-2010	BSc in Physics, Université Libre de Bruxelles (Brussels, Belgium) – <i>Cum Laude</i>
2001-2007	HIGH SCHOOL in Latin-Mathematics, Lycée Émile Jacqmain (Brussels, Belgium) – <i>Cum Laude</i>

Grants & Awards

2020	<i>XMM-Newton</i> observation (PI) - “A deep exploration of chemical enrichment and thermodynamics of S0 galaxies”, AO20, 110 ks (~31 h)
2019	<i>XMM-Newton</i> observation (PI) - “Searching for X-ray non-thermal emission in an extraordinarily radio-bright galaxy group”, AO19, 210 ks (~58 h)
2016	71th Netherlands Astronomy Conference - Poster Prize: Laureate
2006	Orthograph Championship (French): Laureate

Scientific responsibilities & collaborations

2021-now	Co-chair of the Athena Topical Panel SWG1.2 (<i>Athena</i> Science Study team)
2015-now	CHEERS collaboration (PI: J. de Plaa)
now	Ongoing projects / collaborations: E. Pointecouteau, D. Barret, N. Clerc (France) – A. Simionescu, H. Akamatsu, J. de Plaa, J. S. Kaastra, L. Gu, M. Guainazzi, M. Wise (Netherlands) – N. Werner, R. Grossová, J. P. Breuer (Czech Republic) – N. Truong (Germany) – F. Gastaldello, C. Pinto, S. Etti, M. Gaspari, V. Biffi (Italy) – Y. Ichinohe, T. Fukazawa, K. Nomoto (Japan) – Y. Su, A. Tumer (USA) – M.-L. Gendron-Marsolais (Chili) – A. Richard-Laferrrière, A. E. Sansom (UK)
–	Reviewed 5 publications as anonymous referee.
–	Invited in 2 time allocation committees of X-ray observatories.

Conferences, Colloquia & Workshops

INVITED TALKS

- Dec. 2021 “Measuring metal abundances in galaxy groups: challenges and prospects”, *Japan-Netherlands joint workshop: high-resolution X-ray spectroscopy of cosmic plasmas*, online
- Dec. 2020 “Chemical enrichment in galaxy clusters”, *Extragalactic universe with HE and VHE sources*, online
- June 2019 “Chemical abundances in the hot atmospheres of galaxy clusters, groups, and elliptical galaxies”, *Astrophysics of Hot Plasmas in Extended X-ray Sources*, ESAC, Madrid (Spain)
- March 2018 “Spatial distribution of metals in the intracluster medium”, *SnowCluster 2018: The Physics of Galaxy Clusters*, Snowbird, Utah (USA)
- Nov. 2017 “Elemental abundances and chemical enrichment in the intracluster medium”, *Clusters of Galaxies: Physics and Cosmology – International Space Science Institute (Workshop)*, Bern (Switzerland)

CONTRIBUTED TALKS

- Nov. 2021 “The cycle of metals in the elliptical galaxy NGC1404”, *14th ESA SCI-S Workshop (SSW)*, Aranjuez (Spain)
- Oct. 2020 “Metals (and dust) in the hot gas phase: From massive clusters down to massive galaxies”, *The Rise of Metals and Dust through Cosmic Times*, online
- July 2019 “Chemical abundances and enrichment in the intracluster medium”, *Tracing Cosmic Evolution with Clusters of Galaxies*, Sexten (Italy)
- March 2019 “Chemical enrichment of the atmospheric gas in clusters, groups, and massive galaxies”, *Physics of the Intra-Cluster Medium: Theory and Computation*, Budapest (Hungary)
- June 2017 “Radial distribution of metals in the hot intra-cluster medium as observed by XMM-Newton”, *The X-ray Universe 2017*, Rome (Italy)
- April 2017 “Radial metal abundance profiles in the intra-cluster medium of cool-core clusters, groups, and ellipticals”, *Physics of the Intra-Cluster Medium*, Beijing (China)
- May 2016 “CHEERS! The origin of heavy elements in galaxy clusters”, *SRON Science Days*, Delfsen (The Netherlands)
- July 2015 “The CHEERS project”, *The Metal Enrichment of Diffuse Gas in the Universe*, Sexten (Italy)
- May 2015 “CHEERS: Chemical enrichment in the hot gas of galaxy clusters seen through XMM-Newton EPIC”, *Spectroscopy of Cosmic Plasma in the Era of ASTRO-H*, Tokyo (Japan)
- June 2014 “An XMM-Newton view of Abell 4059”, *The X-ray Universe 2014*, Dublin (Ireland)

COLLOQUIA & SEMINARS

- Oct. 2021 “The link between supernovae, supermassive black holes, and the large-scale Universe”, *GRAD Talks (Yildiz Technical University)*, [online](#)
- March 2021 “How to understand stars and supernovae by looking at... galaxy clusters”, *ESTEC breakfast seminar*, online
- Feb. 2021 “From stars to large-scale structures: chemical enrichment in the intracluster medium”, *Video-Seminar (Observatoire de Strasbourg)*, online
- Jan. 2021 “From stars to large-scale structures: chemical enrichment in the intracluster medium”,

IPAG seminar (Université Grenoble-Alpes), online

- Jan. 2021 “From stars to large-scale structures: chemical enrichment in the intracluster medium”, *GECCO Café Club (Laboratoire d’Astrophysique de Marseille)*, online
- Sept 2020 “Dragonfly 44 (...and the dark matter content of ultra-diffuse galaxies)”, *ESTEC breakfast seminar*, online
- April 2020 “Discovery of a giant fossil cavity in the Ophiuchus galaxy cluster”, *ESTEC breakfast seminar*, online
- March 2020 “Does gravity really exist? Clues from galaxy clusters”, *ESTEC breakfast seminar*, Noordwijk (The Netherlands)
- Jan. 2020 “From supernovae to galaxies (and beyond): What metals in hot galactic and cluster atmospheres tell us”, *Kavli IPMU Colloquium*, Tokyo (Japan)
- Jan. 2020 “From supernovae to galaxies (and beyond): What metals in hot galactic and cluster atmospheres tell us”, *Hiroshima University Seminar*, Hiroshima (Japan)
- Jan. 2019 “Elemental abundances and chemical enrichment in the hot intracluster medium”, *MPE seminar*, Garching (Germany)
- Dec. 2018 “Metals in galaxy clusters and groups, and giant elliptical galaxies hot atmospheres: Recent improvements and current challenges of X-ray observations”, *CfA lunch talk*, Cambridge (USA)
- May 2018 “Elemental abundances and chemical enrichment in the hot intracluster medium”, *Hiroshima University Seminar*, Hiroshima (Japan)
- May 2018 “Understanding the chemical enrichment pattern in the hot haloes of massive ellipticals, groups, and clusters of galaxies”, *Kavli IPMU Colloquium*, Tokyo (Japan)
- March 2018 “From supernovae to galaxy clusters: Chemical enrichment in the hot intracluster medium”, *Lowell Observatory Colloquium*, Flagstaff, Arizona (USA)
- Feb. 2018 “Elemental abundances and chemical enrichment in the intracluster medium”, *IRAP Seminar*, Toulouse (France)
- April 2017 “From supernovae to galaxy clusters: Observing the chemical enrichment in the intra-cluster medium”, *PhD Colloquium*, Leiden (The Netherlands)
- Jan. 2017 “From supernovae to galaxy clusters: Chemical enrichment of the intra-cluster medium seen by *XMM-Newton*”, *Ortvoay Colloquium*, Budapest (Hungary)
- “Probing chemical abundances in Abell 4059 using *XMM-Newton*”, *Argelander Institut für Astronomie Seminar*, Bonn (Germany)

POSTERS

- Sept. 2019 “Clusters, groups, and isolated galaxies: similar or different chemical enrichment histories?”, *EAS 2021 (European Astronomical Society Annual Meeting)*, Leiden (online)
- June 2021 “The cycle of metals of the elliptical galaxy NGC 1404”, *Galaxy Cluster Formation II (GCF 2021)*, ESO (online)
- Sept. 2019 “Metals in the intracluster medium”, *X-ray astronomy 2019: Current Challenges and New Frontiers in the Next Decade*, Bologna (Italy)
- Sept. 2018 “Abundance measurements in the intracluster medium: Consequences of spectral code improvements”, *Exploring the Hot and Energetic Universe: The second scientific conference dedicated to the Athena X-ray observatory*, Palermo (Italy)
- Sept. 2017 “Radial distribution of metals in the intra-cluster medium”, *The power of X-ray spectroscopy*, Warsaw (Poland)
- Dec. 2016 “Radial metal abundance profiles in the hot intra-group and intra-cluster medium”, *The Physics of Groups and Galaxy Properties therein*, Paris (France)
- May 2016 “Chemical enrichment in the hot intra-cluster medium seen with *XMM-Newton*/EPIC”, *XMM-Newton: The next decade*, ESAC, Madrid (Spain)

- May 2016 “The origin of heavy elements in galaxy clusters”, *71th Netherlands Astronomy Conference*, Nunspeet (The Netherlands)
 “An *XMM-Newton* study of temperatures and abundances in Abell 4059”, *70th Netherlands Astronomy Conference*, Nunspeet (The Netherlands)
 “Chemical enrichment in clusters of galaxies from the *XMM/Suzaku* to the *ASTRO-H* era”, *4th ASTRO-H summer school*, Shuzenji (Japan)

Teaching & Outreach

- 2021 Supervising MSc students (Teresa Matamoro, Amanda Byström): [LEAPS summer programme](#), ESTEC
 2021 Co-supervising MSc student (Dimitris Chatzigiannakis): MSc thesis, Leiden Observatory
 2020 Supervising BSc student (Tora Arnesen): [LEAPS summer programme](#), ESTEC
 2020 Co-supervising BSc student (Iga Kaczmarek): ESA internship, ESTEC
 2019 “[Astronomy on Tap - Budapest](#)” (co-organiser), wide audience
 2018 High energy astrophysics (guest lecturer), MSc level, Eötvös University
 2018-2019 Co-supervising BSc student (Anna Görgei): BSc thesis, Eötvös University
 2017-2018 Co-supervising BSc student (Ádám Boldog): BSc thesis, Eötvös University
 Sum. 2015 Co-supervising BSc student (Sinancan Kara): BSc thesis, SRON/Bogazici University
 2014-2015 High energy astrophysics (Teaching assistant), MSc level, Leiden Observatory
 2011-2013 Private student tutoring (Mathematics; physics), high school level, Brussels
 2007-now Astronomy camp (teaching & animating, high school level), “[Jeunesse et Science ASBL](#)”, Modave (Belgium)

OUTREACH TALKS

- Sept. 2021 “The link between supernovae, supermassive black holes, and the large-scale Universe”, *Astronomy on Tap - Leiden*, Leiden (The Netherlands)
 Aug. 2020 “Black holes” (in French), *Jeunesse et Science*, Modave (Belgium)
 Dec. 2019 “Space telescopes” (in French), *Jeunesse et Science*, Modave (Belgium)
 July 2019 “Clusters of galaxies... and the surprises of their spectacular hot atmospheres”, *Astronomy on Tap - Budapest*, Budapest (Hungary)
 April 2019 “The dark side of matter”, *Astronomy on Tap - Budapest*, Budapest (Hungary)
 Dec. 2018 “Pluto (and the borders of the Solar System)” (in French), *Jeunesse et Science*, Modave (Belgium)
 Dec. 2017 “Stellar nucleosynthesis” (in French), *Jeunesse et Science*, Modave (Belgium)
 Jan. 2017 “A journey to the stars” (in French), *Heydeken rest home*, Brussels (Belgium)
 April 2016 “Clusters of galaxies” (in French), *Jeunesse et Science*, Modave (Belgium)
 Aug. 2014 “Clusters of galaxies” (in French), *Jeunesse et Science*, Modave (Belgium)
 April 2013 “Massive stars” (in French), *Jeunesse et Science*, Modave (Belgium)
 Aug. 2012 “The Sun across time” (in French), *Jeunesse et Science*, Modave (Belgium)
 Aug. 2011 “Dark matter” (in French), *Jeunesse et Science*, Modave (Belgium)
 Aug. 2010 “Death of stars” (in French), *Jeunesse et Science*, Modave (Belgium)
 April 2008 “Black holes” (in French), *Jeunesse et Science*, Modave (Belgium)

Department responsibilities & initiatives

Member of the ESTEC SAC (Staff Association Committee), ESTEC
Member/coordinator of the YPAG (Young Professional Advisory Group), ESTEC
Organiser of weekly “breakfast seminars”, ESTEC
Organiser of a mini-workshop on galaxy clusters (~15 participants from Dutch institutes), ESTEC
Webmaster of the [Lendület Hot Universe Research Group](#) website, Budapest
LOC member of the “[Physics of the Intra-Cluster Medium: Theory and Computation](#)” conference, Budapest
Chair/organiser of regular “Galaxy clusters meetings”, Leiden Observatory
Organiser of the colloquium dinner events, SRON
Member of the “Social committee”, Leiden Observatory
Online updater of arXiv preprints, Leiden Observatory website

Last updated: December 6, 2021