



Women Scientists Who Made Nuclear Astrophysics






Funded by the Horizon 2020 Framework Programme of the European Union



This is a promotional 2021 calendar commemorating "Women Scientists Who Made Nuclear Astrophysics", presented by COST Action ChETEC (CA16117) for the development of young scholars. A digital version can be freely downloaded at the weblink: www.chetec.eu, along with the associated poster on the same topic.

Goals

"A powerful way to study the evolution of the cosmos is via the chemical fingerprints left by the nuclear reactions that take place in stars. These are the goals of our ChETEC (pronounced [ketek]) COST Action, which stands for Chemical Elements as Tracers of the Evolution of the Cosmos." Weblink: www.chetec.eu

Acknowledgements

COST Action ChETEC (CA16117) is supported by COST (European Cooperation in Science and Technology). COST is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation. Weblink: www.cost.eu

The Joint Institute for Nuclear Astrophysics - Center for the Evolution of the Elements, JINA-CEE, is an interdisciplinary multi-institutional center to advance knowledge in nuclear astrophysics. JINA-CEE is a US National Science Foundation Physics Frontiers Center, supported under Grant No. PHY-1430152. Website: www.jinaweb.org

The International Research Network for Nuclear Astrophysics, IReNA, connects six interdisciplinary research networks across 3 continents to foster international collaboration, complement and enhance research capabilities, thus accelerating progress in nuclear astrophysics. IReNA is a US National Science Foundation AccelNet Network of Networks supported under Grant No. OISE-1927130 Website: www.irenaweb.org

We also acknowledge funding from the following: LIBPhys, NOVA FCT and SPF (Portuguese Physical Society) and Romanian Ministry of Education and Research, the Program Nucleu, within MCI, project number PN19150201/16N/2019 and project number PN-III-P1-1.2-PCCDI-2017-0839/19PCCDI/2018, within PNCDI III and H2020-MSCA-NIGHT-2020/954638 - DoReMi-RO and the Netherlands Organization for Scientific Research (NWO) as part of the Vidi/Aspasia program BinWaves (639.042.728, PI de Mink) and The Hebrew University of Jerusalem and the Konkoly Observatory and the Hungarian Academy of Sciences.

We thank E. J. Jacobsen for proofreading the Danish translation and A. Becerril Reyes, JINA-CEE and E. Bányai and B. Cseh, Konkoly Observatory for help with the calendar printing and distribution.

Art

Collectively, the background art images form a series titled: "The Fabric of Space Time" - a fantasy cosmos filled with beautiful kaleidoscopic stars, each representing one scientist in this calendar and a simulated space time convoluted into flowing, hexagonal building blocks that describe cosmic events such as mergers and novae and supernovae.



Our purpose is to honor, to encourage, and to educate

To honor the women who have influenced the development of Nuclear Astrophysics;

To encourage young scholars to choose Nuclear Astrophysics as their career path and to present to them good role models for the process;

To educate the scientific community and the general public about the significant role women have played and continue to play in the development of Nuclear Astrophysics.

Nuclear astrophysics is a melding of theoretical and experimental nuclear physics, observational astronomy, astrophysical modeling, and cosmological theory. Women scientists have been an essential part of the development of these fields, having made tremendous contributions in the form of astronomical observations, visual and spectroscopic identifications, star classifications and catalogues, prediction and discovery of stellar objects, design and construction of instrumentation, theoretical and experimental discoveries of nuclear materials, physics explanations, mathematical derivations and chemical interpretations of all things -- galactic and beyond.

Everyone benefits from role models. Female role models reduce the impact on women of stereotype threat, i.e., of being at risk of conforming to a negative stereotype about one's social, gender, or racial group [1,2]. This can lead women scientists to underperform or to leave their scientific career because of negative stereotypes such as, not being as talented or as interested in science as men. Sadly, history rarely provides role models for women scientists; instead, it often renders these women invisible [3]. In response to this situation, we present a selection of twelve outstanding women who helped to develop nuclear astrophysics.

Three categories of photographs have been identified as being important for this project: early career, mid-career, and action photos. We have directed our efforts to appeal to young scholars, making early career photos especially appropriate. To see what a Nobel Laureate, for example, looked like in her twenties is important when trying to attract young scholars in their twenties. This will provide visual role models in order to answer the larger question: What does a scientist look like? The hoped for answer to be generated in the minds of today's young scholars will be: A scientist looks just like me! The mid-career photos are those representations that may have been displayed at the height of the scientist's career. They show a more mature woman who may be recognizable to various groups in the sciences. Action photos are also important because they place the scientist within the context of their work in the laboratory or observatory.

We have presented this information in poster format [4], a copy of which can be freely downloaded at [www.chetec.eu]. The resulting paper has been published in the Springer Proceedings in Physics book series [5]. This calendar, which will be translated into over thirty languages, is the completion of the final goal of our project.

[1] See, e.g., "Delusion of gender" Cordelia Fine, 2010, W.W. Norton and Co. ISBN 0-393-06838-2, page 36 and references therein.

[2] Steele & Aronson, 1995, "Stereotype threat and the intellectual test performance of African-Americans" *Journal of Personality and Social Psychology*, 69, 797-811.

[3] "...by moving a woman to the background, by making her disappear completely from the narrative, by minimising her involvement, by fiddling with the story [...], by diminishing or stealing her work, by confining her to the role of 'wife of' or 'sister of' [or 'assistant of'], auto-erasure..." <http://www.cafebabel.co.uk/society/article/georgette-sand-when-history-makes-women-invisible.html>

[4] M. Lugaro, et al., "Women Scientists Who Made Nuclear Astrophysics", Poster presented at the 15th International Symposium on Nuclei in the Cosmos, Assergi, L'Aquila, Italy, June 24-29, 2018.

[5] Hampton C.V. et al. (2019) Women Scientists Who Made Nuclear Astrophysics. In: Formicola A., Junker M., Gialanella L., Imbriani G. (eds) *Nuclei in the Cosmos XV*. Springer Proceedings in Physics, vol 219. Springer, Cham. Preprint available at: <http://arXiv.org/abs/1809.01045>

AUTHORS: Research/ Writing/ Promotion

Maria Lugaro	Konkoly Observatory H-1121 Budapest, Hungary maria.lugaro@csfk.mta.hu	Claudia Lederer-Woods	SUPA, School of Physics and Astronomy, University of Edinburgh, Edinburgh EH9 3FD, UK
Christine V. Hampton	CV Hampton Consulting, LLC, Okemos, MI 48805, USA chrishva@umich.edu	Ewa Niemczura	University of Wrocław, Kopernika 11, PL-51-622 Wrocław, Poland
Panagiota Papakonstantinou	Institute for Basic Science, Rare Isotope Science Project, Daejeon 34047, South Korea	Thomas Rauscher	Centre for Astrophysics Research, University of Hertfordshire, Hatfield AL 109AB, UK and Department of Physics, University of Basel, 4056 Basel, Switzerland
P. Gina Isar	Institute of Space Science, Bucharest -Magurele 077125, Romania	Artemis Spyrou	NSCL, JINA-CEE, and Department of Physics and Astronomy, Michigan State University, MI USA
Birgitta Nordström	Niels Bohr Institute, Blegdamsvej 17, DK-2100 Copenhagen, Denmark	Sophie Van Eck	Institut d'Astronomie et d'Astrophysique, Université libre de Bruxelles, Belgium
Nalan Özkan	Department of Physics, Kocaeli University, Umuttepe 41380, Kocaeli, Turkey	Mariya Yavahchova	Institute for Nuclear Research & Nuclear Energy, Bulgarian Academy of Sciences, Bulgaria
Marialuisa Aliotta	SUPA, School of Physics and Astronomy, University of Edinburgh, Edinburgh EH9 3FD, UK	William Chantereau	Astrophysics Research Institute, Liverpool John Moores University, Liverpool, L3 5RF, UK
Aleksandra Čiprijanović	Department of Astronomy, Faculty of Mathematics, University of Belgrade, Serbia	Selma E. de Mink	Anton Pannekoek Institute for Astronomy, University of Amsterdam, The Netherlands
Sanjana Curtis	Department of Physics, North Carolina State University, Raleigh, NC 27606, USA	Etienne Kaiser	Astrophysics Group, Keele University, ST5 5BG Keele, UK
Marcella Di Criscienzo	INAF - Osservatorio di Roma, via Frascati 33, Monteporzio Catone, Rome, Italy	Friedrich-Karl Thielemann	Department of Physics, University of Basel, 4056 Basel, Switzerland and GSI Helmholtz Center for Heavy Ion Research, Darmstadt, Germany
Jacqueline den Hartogh	Konkoly Observatory H-1121 Budapest, Hungary	Claudia Travaglio	INFN-Turin, Astrophysical Observatory Turin, Italy
Andreea S. Font	Astrophysics Research Institute, Liverpool John Moores University, Liverpool, L3 5RF, UK	Apama Venkatesan	Department of Physics and Astronomy, University of San Francisco, San Francisco, CA 94117, USA
Anu Kankainen	Department of Physics, University of Jyväskylä, PO Box 35 (YFL), F1 40014, Finland	Remo Collet	Stellar Astrophysics Centre, Dept. of Physics and Astronomy, Aarhus University, Denmark
Chiaki Kobayashi	Centre for Astrophysics Research, University of Hertfordshire, Hatfield AL 109AB, UK		



Language	Translators/ Proofreaders	Institute	Language	Translators/ Proofreaders	Institute
Armenian	Ani Aprahamian	University of Notre Dame (USA)	Hungarian	József Kovács	ELTE Eötvös Loránd University Gothard Astrophysical Observatory (Hungary)
Bulgarian	Mariya Yavahchova	Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences	Icelandic	Rubina Kotak	University of Turku (Finland)
Bulgarian	Sevdalina Dimitrova	Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Science	IsiNdebele	Sifundo Delton Binda Thokozani Masemola Nomvula Mabena	University of the Witwatersrand (South Africa) University of Pretoria (South Africa) University of South Africa (South Africa)
Bulgarian	Ivanka Stateva	Institute of Astronomy, Bulgarian Academy of Sciences	IsiZulu	Thuthukile Khumalo	University of the Witwatersrand (South Africa)
Catalan	Jordi Jose	Universitat Politècnica de Catalunya (Spain)	Italian	Maria Letizia Sergi	Università di Catania & INFN-LNS, (Italy)
Chinese	Yutian Li	Institute of Modern Physics Chinese Academy of Sciences (P. R. China)	Italian	Flavia Dell'Agli	INAF Osservatorio Astronomico di Roma (Italy)
Chinese	Xiaodong Tang	Institute of Modern Physics, Chinese Academy of Sciences (P.R. China)	Japanese	Nobuya Nishimura	Riken (Japan)
Croatian	Neven Soic & PhD students	Ruder Boskovic Institute Zagreb (Croatia)	Japanese	Shio Kawagoe	University of Tokyo (Japan)
Czech	Barbora Dolezalova	Astronomical Institute, Czech Academy of Sciences	Lithuanian	Arunas Kucinskas	Vilnius University (Lithuania)
Danish	Camilla J. Hansen	Max Planck Institute for Astronomy (Germany)	Lithuanian	Rigonda Skorulskiene	Vilnius University (Lithuania)
Danish	Birgitta Nordström	Copenhagen University (Denmark)	Maltese	Marthese Borg	University of Malta (Malta)
Dutch	Jacqueline den Hartogh	Konkoly Observatory (Hungary)	Norwegian	Ann-Cecilie Larsen	University of Oslo (Norway)
Dutch	Hannah Brinkman	Konkoly Observatory and University of Szeged (Hungary)	Polish	Ewa Niemczura	University of Wrocław (Poland)
Dutch	Selma de Mink	Harvard University (USA)	Portuguese	Adelaide Pedro de Jesus	Universidade Nova de Lisboa (Portugal)
English	Christine V. Hampton	CV Hampton Consulting, LLC (USA)	Romanian	Andreea Font	Liverpool John Moores University (UK)
Estonian	Laurits Leedjärv	University of Tartu (Estonia)	Romanian	Gina Isar	Institutul de Științe Spațiale (România)
Finnish	Anu Kankainen	University of Jyväskylä (Finland)	Russian	Olga Maryeva	Astronomical Institute of Czech Academy of Sciences
French	Sophie Van Eck	Université Libre de Bruxelles (Belgium)	Serbian	Aleksandra Ciprijanovic	Fermi National Accelerator Laboratory (USA)
French	Benoit Côte	Konkoly Observatory (Hungary)	Slovak	Rudolf Galis	P. J. Šafárik University (Slovakia)
French	Ana Palacios	University of Montpellier (France)	Slovak	Lucia Gálisová	Technical University of Košice (Slovakia)
French	William Chantreau	Liverpool John Moores University (UK)	Slovenian	Matej Lipoglavsek	Jozef Stefan Institute (Slovenia)
Galician	Ana Ulla-Miguel	University of Vigo (Spain)	Spanish	Olga Zamora	Instituto de Astrofísica de Canarias (Spain)
Galician	Martin Pawley	IO Astronomical Association (Spain)	Spanish	Ana Palacios	Université de Montpellier (France)
German	Etienne Kaiser	Keele University (UK)	Spanish	Gabriel Martínez Pinedo	GSI Darmstadt (Germany)
German	Friedrich Thielemann	University of Basel (Switzerland) and GSI Darmstadt (Germany)	Spanish	Martha Irene Saladino	https://misaladino.com/ Uppsala University (Sweden)
German	Carla Frohlich	North Carolina State University (USA)	Swedish	Andreas Korn	Uppsala University (Sweden)
Greek	Theo J. Mertzimekis and NuSTRAP group	University of Athens (Greece)	Swedish	Bengt Edvardsson	University of the Witwatersrand (South Africa)
Hebrew	Moshe Friedman	Hebrew University of Jerusalem (Israel)	Tshivenda	Nyawasedza Magoda	University of the Witwatersrand and iThemba Labs (South Africa)
Hungarian	Borbála Cseh	Konkoly Observatory (Hungary)	Tshivenda	Philip Adsley	Kocaeli University (Turkey)
			Turkish	Nalan Özkan	University of Jyväskylä (Finland)
			Ukrainian	Olga Beliuskina	Odessa National University (Ukraine)
			Ukrainian	Tamara Mishenina	



Photo Credits:

Cover Clockwise 1) **Yuasa**: Courtesy Ochanomizu University, History Museum, Yuasa Yuko Materials: Picture 006 2) **Müller**: At conference, Courtesy R. J. Rutten, Utrecht University 3) **Payne**: Cecilia Payne Gaposchkin working with equipment, Astronomical Society of the Pacific, courtesy AIP Emilio Segrè Visual Archives, Physics Today Collection [gaposchkin_cecilia_f1] 4) **Mayer**: Portrait of Dr. Maria Goeppert-Mayer [At desk with slide rule in hand], U.S. Department of Energy (Public Domain), photos-department of energy- 10481713035. 5) **Eryurt**: At lectern. Courtesy METU Physics Department 6) **Böhm-Vitense**: A photo of Erika during grad school years, Courtesy U. of Washington via Julie Lutz 7) **Meitner**: Catholic University of America, 1946, Acc.90-105 - Science Service, Records, 1920s-1970s, Smithsonian Institution Archives, Wikimedia, .Page 2 1) **Eryurt**: Courtesy METU Physics Department 2) **Böhm-Vitense**: At Heidelberg viewing transparency, Courtesy U. of Washington via Julie Lutz 3) **Curie**: At the electrocope, MCP87 Photo Henri Manuel. Source : Musée Curie (coll. ACJC) 4) **Burbidge**: Portrait of E. Margaret Burbidge viewing astronomical slides at the American Astronomical Society (AAS) meeting, circa 1980, AIP Emilio Segrè Visual Archives, Physics Today Collection, [Burbidge Eleanor Margaret - A1] Page 3 1) **Curie**: In laboratory (later years), MCP137 Photo Henri Manuel. Source : Musée Curie (coll. ACJC) 2) **Tinsley** Casual portrait of Beatrice Tinsley sitting at a desk with pencil in hand. Catalog Number: [Tinsley Beatrice B4], Credit: Astronomical Society of the Pacific, courtesy AIP Emilio Segrè Visual Archives 3) **Payne**: Acc. 90-105 - Science Service, Records, 1920s-1970s, Smithsonian Institution Archives, File: Cecilia_Helena_Payne_Gaposchkin_(1900-1979)_3 via Wikimedia Commons 4) **Mărăcioreanu**: At Radium Institute, MCP1780 Photo Henri Manuel. Source : Musée Curie (coll. ACJC) **Biographical Pages - Upper photos** **Curie**: AIP Emilio Segrè Visual Archives, Image [Curie Pierre-C6], (detail) Portrait of Pierre and Marie Curie 1895 Public Domain Mark 1.0 **Meitner**: AIP Emilio Segrè Visual Archives [meitner_lise_a3] **Mărăcioreanu**: Photo Citation: Ro.Wikipedia.org, Public Domain via Wikimedia Commons **Payne**: Courtesy: Historical Archives, Newnham College Cambridge [Payne Gaposchkin Cecilia] 1923 **Mayer**: AIP Emilio Segrè Visual Archives, Bom Collection [Mayer Maria A5]; courtesy of Churchill Archives Centre, Cambridge. **Yuasa**: Courtesy Ochanomizu University, History Museum, Yuasa Yuko Materials: Picture 005 **Caughlan**: © Copyright 2001-2018 Montana State University Library, Merrill G. Burlingame Special Collection, Accession 12001 ID: parc-001585. **Müller**: Courtesy R. J. Rutten, Utrecht University **Burbidge**: American Astronomical Society (2001), Committee on the Status of Women in Astronomy, A Tribute by Vera Rubin. **Böhm-Vitense**: AIP Emilio Segrè Visual Archives [bohm_vitense_erika_a1], courtesy Department of Physics, University of Illinois at Urbana-Champaign, **Eryurt**: Courtesy METU Physics Department **Tinsley**: AIP Emilio Segrè Visual Archives [tinsley_beatrice_a1], Courtesy of Brian Tinsley, U. of Texas at Dallas. **Biographical Pages - Lower Photos**: **Curie**: AIP Emilio Segrè Visual Archives [curie_marie_a2] **Meitner**: AIP Emilio Segrè Visual Archives [meitner_lise_a8] **Mărăcioreanu**: Detail MCP1780 Photo Henri Manuel. Source : Musée Curie (coll. ACJC). **Payne**: Detail from Acc. 90-105 - Science Service, Records, 1920s-1970s, Smithsonian Institution Archives, File: Cecilia_Helena_Payne_Gaposchkin_(1900-1979)_3 via Wikimedia Commons. **Mayer**: AIP Emilio Segrè Visual Archives, [mayer_marie_a2] **Yuasa**: Courtesy Ochanomizu University, History Museum, Yuasa Yuko Materials: Picture 149. **Burbidge**: AIP Emilio Segrè Visual Archives, Physics Today Collection, detail [Burbidge Eleanor Margaret-A1]. **Böhm-Vitense**: Courtesy U. of Washington via Julie Lutz, [Erika Bohm Vitense 2017-03-23] **Eryurt**: Courtesy METU Physics Department **Tinsley**: Courtesy of Brian Tinsley, U. of Texas at Dallas. [Beatrice_1966].

Bibliography:

Curie 1) *Traité de Radioactivité*. 2 volume book, Gauthier-Villars, Paris 1910 **2)** TheConversation Homepage, <https://theconversation.com/us/topics/marie-curie-32867>. Jorgensen, T. J.: Marie Curie and Her X-Ray Vehicle Contribution to World War I Battlefield Medicine **3)** Marie Curie - War Duty (1914-1919) <https://history.aip.org/exhibits/curie/war2.htm> **4)** Nobelprize.org https://www.nobelprize.org/nobel_prizes/themes/other/womens-day-2017.htm **5)** Fun Fact: L.D. Schmadel, Dictionary of Minor Planet Names, 3rd ed., Springer 2013 **6)** Quote: 35 Inspirational Marie Curie Quotes On Success_AwakenTheGreatnessWithin.pdf **Meitner 1)** Meitner, L., Frisch, O. R. (1939). "Disintegration of Uranium by Neutrons: A New Type of Nuclear Reaction" *Nature* 143 (3615): 239. <http://adsabs.harvard.edu/abs/1939Natur.143.239M> **2)** Fun Fact: U.S. Patent US1076141 **3)** Quote: "Lise Meitner." AZQuotes.com. Wind and Fly LTD, 2020. 05 February 2020. https://www.azquotes.com/author/24109-Lise_Meitner **Mărăcioreanu 1)** Recherches sur la constante du polonium et sur la pénétration des substances radioactives dans les métaux, doctoral thesis, Paris, Les Presses Universitaires de France, 1924, pp. 82 **2)** Marco Fontani et al., "Science is Not a Totally Transparent Structure: Ștefania Mărăcioreanu and the Presumed Discovery of Artificial Radioactivity", An International Journal of the History of Chemistry, Vol 1, No 1 (2017) <https://nivist.fupress.net/index.php/subs/article/view/14> **3)** Fun Fact: TheStampCollector.net/Romanianinvents.html **4)** Quote: Marelene F. Rayner-Canham, Geoffrey Rayner-Canham (1997). A Devotion to Their Science: Pioneer Women of Radioactivity. Chemical Heritage Foundation, pp. 87–91. ISBN 0941901157. Retrieved 3 November 2014. **Payne Gaposchkin 1)** Stellar Atmospheres; A Contribution to the Observational Study of High Temperature in the Reversing Layers of Stars, PhD Thesis 1925 <http://adsabs.harvard.edu/abs/1925PhDT.....1P> **2)** Fun Fact: The Glass Universe – Dava Sobel, Viking Press 2016. **3)** Quote: https://www.goodreads.com/author/quotes/5806784.Cecilia_Payne_Gaposchkin **Goeppert Mayer 1)** Nuclear Configurations in the Spin-Orbit Coupling Model. I. Empirical Evidence. *Phys. Rev.* 78, 16 (1950) <https://doi.org/10.1103/PhysRev.78.16> **2)** Fun Fact and Quote: <https://ucsdnews.ucsd.edu/archives/date/101019> **3)** Quote: https://www.AZQuotes.com/author/29356-Maria_Goeppert_Mayer **Yuasa 1)** Nakamura, H., Reide, F., & Yuasa, T. (1973). A detection system with a large liquid scintillation counter for high energy neutron studies with neutron gamma discrimination. *Nuclear Instruments and Methods* 108(3), 509-516. www.sciencedirect.com/science/article/pii/0029554X73905326 [archive] résumé **2)** Yagi, E., Matsuda, H., Narita, K. (1997). Toshiko Yuasa (1909-1980), and the Nature of Her Archives at Ochanomizu Univ. in Tokyo. *Historia Scientiarum. Second series: International Journal of the History of Science Society of Japan*, 7(2), 153-162. **3)** Biography of Toshiko Yuasa, www.th.u-psud.fr/YUASA150/Yuasa_event/program/talks/kou.pdf **4)** Fun Fact: Patents FR1145132, FR1235474; Fun Fact: <http://archives.cf.ocha.ac.jp/en/researcher/yaasa.toshiko.html> Listing #47 in pdf file of her publications. **5)** Quote: <http://adsabs.harvard.edu/abs/1988ADNDT..40..283C> **2)** Georgeanne R. Caughlan's scientific contributions affiliated with Montana State University https://www.researchgate.net/scientificcontributions/72243718_Georgeanne_R_Caughlan **3)** Quote: <https://peoplepill.com/people/georgeanne-r-caughlan/> **Müller 1)** Goldberg, L., Müller, E. A., Aller, L. H., ApJ (1960), 5, 1, The Abundances of the Elements in the Solar Atmosphere **2)** Chmielewski, Yves (1998). "Edith Alice Müller (1918–1995). Short biography", in: Remembering Edith Alice Müller, eds. Immo Appenzeller et al., Springer, 1998, pp. 6–8. Bibliography **3)** Fun Fact: Chorbachi, W. K. (1989). "In the tower of babel: beyond symmetry in Islamic design", Computers and Mathematics with Applications, Volume 17, Issues 4–6, 1989, pp. 751–789, doi:10.1016/0898-1221(89)90260-5, MR0994228 **4)** Thesis: E. Müller, Gruppentheoretische und Strukturanalytische Untersuchungen der Maurschen Ornamente aus der Alhambra in Granada (Inaugural-Dissertation for a Doctorate from the University of Zürich). Buchdruckerei Baublatt, Riischlikon (1944). **Burbidge 1)** E. M. Burbidge, G. R. Burbidge, W. A. Fowler, F. Hoyle (1957), Synthesis of the Elements in Stars, *Reviews of Modern Physics*, vol. 29, Issue 4, pp. 547-650 <http://adsabs.harvard.edu/abs/1957RvMP...29..547B> **2)** Fun Fact and Quote: <https://ucsdnews.ucsd.edu/archives/date/101019> **3)** Quote: <https://www.nytimes.com/2020/04/06/science/space/e-margaret-burbidge-dead.html> **Böhm-Vitense 1)** Böhm-Vitense, E. (1958) Über die Wasserstoffkonvektionszone in Sternen verschiedener Effektivtemperaturen und Leuchtkräfte. Mit 5 Textabbildungen, *Zeitschrift für Astrophysik*, vol 46, pp. 108-143 <http://adsabs.harvard.edu/abs/1958ZA....46..108B> **2)** Fun Fact: J. Lutz and G. Wallerstein, BAAS: BAAS, 2017, 49, 021 DOI: 10.3847/BAASOBIT2017021 **Ezer Eryurt 1)** Ezer, D., Cameron, A. G. W., The early evolution of the Sun, (1963) *Icarus*, 1, 422 **Tinsley 1)** An Accelerating Universe, 1975, *Nature* 257, 454 – 457 (9 Oct.1975); doi:10.1038/257454a0 **2)** Beatrice Tinsley <https://physicstoday.scitation.org/doi/10.1063/PT.5.031405/full> **3)** University of Canterbury, <http://www.canterbury.ac.nz/about/capitalworks/projects/rsic/rsic-stage-2/> Building named to honor Beatrice Tinsley will be completed in 2019 **4)** Poem: <https://www.nytimes.com/2018/07/18/obituaries/overlooked-beatrice-tinsley-astronomer.html> **United Nations International Day Observances**: <https://www.un.org/en/sections/observances/international-days>

Marie Salomea Skłodowska Curie

1867-1934

"It is my earnest desire that some of you should carry on this scientific work and keep for your ambition the determination to make a permanent contribution to science." - Marie Curie

Mention nuclear physics and the first name that comes to mind is that of Polish-born, Marie Skłodowska Curie. With her husband Pierre, Marie investigated radiation phenomena. She is credited with the development of the theory of radioactivity; the techniques for isolating radioactive isotopes; and the discovery of two chemical elements, polonium and radium. The Curies were awarded the Nobel Prize in Physics in 1903 and Marie won another, in Chemistry in 1911, becoming the first person to claim Nobel honors twice. After Pierre's tragic death in 1906, she accepted his faculty position at the Sorbonne. Marie Curie was a humanitarian who worked to save soldiers' lives during WWI. She developed a mobile x-ray unit powered by a dynamo; created a fleet of vehicles for the battlefield; taught a radiology course for doctors and nurses; and then, operated one of the x-ray vehicles on the battlefield. She is the founder of the Radium Institute in Warsaw. The Curie Institute in Paris, a major centre for medical research today was named for her. Professor Curie's outstanding achievements and response to challenges have inspired and will continue to inspire scientists for generations to come.



FUN FACTS

- Curium, Cm (element 96) was named to honor Marie Curie and her husband, Pierre.
- Asteroid 7000 Curie was named for Marie and Pierre Curie. It was discovered in 1939 by Fernand Rigaux at Uccle, Belgium.

Art: The Fabric of Space-Time - The Merger

January 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	31	1	2	3
				New Year's Day		1994 - Anniversary of the death of Georgeanne R. Caughlan
4 <small>2nd January (substitute day) (Scotland)</small>	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
			2017 - Anniversary of the death of Erika Helga Ruth Bohm-Vitense			International Day of Education (A/RES/73/26)
25	26	27	28	29	30	31
		1941 - Anniversary of the birth of Beatrice Muriel Tinsley				
December '20 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	February '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	Notes				

Lise Meitner

1878-1968

"You must not blame us scientists for the use which war technicians have put our discoveries."
-Lise Meitner

Lise Meitner was born in Vienna and studied Physics, Mathematics and Philosophy at the University of Vienna. In 1906, she was the second woman there to receive a doctorate in Physics. She moved to Berlin in 1907 where she met Otto Hahn, with whom she collaborated for the following 30 years. She was the first woman to become a full professor in Germany. Lise was Jewish; her life in Nazi Germany became increasingly at risk. In 1938 she fled to Sweden where she continued her research. One of her most significant scientific achievements is the theoretical explanation of nuclear fission, a work that she published with her nephew Otto Frisch in 1939. Otto Hahn was awarded the Nobel Prize in Chemistry in 1944 for the experimental component of this work. She also studied radioactivity and together with Otto Hahn discovered a number of radioactive isotopes, such as Protactinium 231. Lise Meitner was nominated for the Nobel Prize 48 times (29 in Physics and 19 in Chemistry), but none was ever awarded to her.



FUN FACTS

- Lise Meitner was listed as inventor on a US patent for the preparation of radiothorium. The patent was filed (and owned) by a German company, Dr. Knöfler & Co. It was a valid patent until 1933 (expiring because it reached its maximum legal lifetime of 20 years). [Radiothorium is now known as Thorium-228 and the Mesothorium also mentioned in the patent is Radium-228.]
- Meitnerium, Mt (element 109) was named to honor Lise Meitner.

Art: The Fabric of Space-Time - Reflection Nebula

February 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	2	3	4	5	6	7
1980 - Anniversary of the death of Toshiko Yuasa				1918 - Anniversary of the birth of Edith Alice Muller		
8	9	10	11	12	13	14
			International Day of Women and Girls in Science (A/RES/70/212)			
15	16	17	18	19	20	21
					1972 - Anniversary of the death of Maria Goeppert Mayer	
22	23	24	25	26	27	28
1	2	3	4	5	6	7
January '21 M T W T F S S 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	March '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Ștefania Mărăcișeanu

1882-1944

“ I have great esteem for the work that [Ștefania Mărăcișeanu] has accomplished. In particular, she has acquired a perfect knowledge of precise electrometric measurements.” – Marie Curie

Ștefania Mărăcișeanu was born in Bucharest, Romania and graduated from the Faculty of Science of the University of Bucharest in 1910. After a teaching career in secondary schools, at the age of 40, she obtained a fellowship at the Radium Institute in Paris working with Marie Skłodowska Curie on radioactivity. In 1924, she defended her PhD at the Sorbonne in Paris on the subject of “Research on the [decay] constant of polonium and the penetration of radioactive substances in metals”. Although Ștefania did not explain the phenomenon theoretically nor prove it experimentally, she may have introduced the philosophical concept of “artificial radioactivity”, i.e., the potential of a radioactive element to induce radioactivity in a stable element. After her PhD, Dr. Mărăcișeanu worked on developing techniques for atmospheric nucleation reactions in rain clouds, then returned to Romania in 1930 to install their first Radiation Laboratory where she continued her research. Since 1937, she was a Correspondent Member of the Romanian Academy of Science, until she died of cancer due to radioactive irradiation.



FUN FACT

In 2003, Romfilatelia, Romania's stamp issuing authority released a set of three stamps called 'Women and Inventics'. The 1LEI stamp features a photo of Marie Curie containing Ștefania Mărăcișeanu's name on it.

Art: The Fabric of Space-Time - Supernova I

March 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
International Women's Day	16	17	18	19	20	21
15	16	St Patrick's Day (Northern Ireland)	18	19	Spring Equinox 0937 UTC	21
22	23	24	25	26	27	28
29	1981 - Anniversary of the death of Beatrice Muriel Tinsley	31	1	2	3	4
February '21	April '21	Notes				
M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30					

Cecilia Helena Payne Gaposchkin

1900-1979

“ Young people, especially young women often ask me for advice. Here it is valeat quantum [valere potest]. Your reward will be the widening of the horizon as you climb. And if you achieve that reward you will ask no other.”
- Cecilia Payne-Gaposchkin

Cecilia Payne-Gaposchkin was a British-American astronomer. In 1919, she enrolled at Cambridge University and became fascinated with astronomy after attending a lecture by Arthur Eddington on how solar eclipses can be used to test general relativity. She later moved to America, where she received a PhD from Radcliffe College at Harvard. During her PhD, she made the breakthrough discovery that the strength of stellar spectral lines depend not only on the stellar surface composition, but also on the degree of ionisation at a given temperature. She concluded that hydrogen and helium are much more abundant in stars than all other chemical elements - an idea so revolutionary at the time that she was initially discouraged from publishing her results. In 1956, she became the first woman full-professor at Harvard's Faculty of Arts and Sciences. Later she became the Chair of the Department of Astronomy, being the first woman to ever chair a department at Harvard.



FUN FACT

Cecilia Payne-Gaposchkin worked as a " Human Computer" for the Harvard College Observatory, reading spectroscopic lines on glass plates in order to interpret star composition and temperature.

Art: The Fabric of Space-Time - Stellar Wind

April 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	31	1	2	3	4
5	6	7	8	9	10	11
2020 - Anniversary of the death of E. Margaret Burbidge		World Health Day [WHO] (WHA/A.2/Res.35)				
12	13	14	15	16	17	18
International Day of Human Space Flight (ARES/65/271)						
19	20	21	22	23	24	25
		World Creativity and Innovation Day (ARES/71/284)	International Mother Earth Day (A/RES/63/278)			
26	27	28	29	30	1	2
World Intellectual Property Day [WIPO]		World Day for Safety and Health at Work				
March '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	May '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Maria Goeppert Mayer

1906-1972

“ Maria Mayer played a big role in figuring out the stability of the elements.” –M. Thiemans, UC San Diego

Magic nucleon numbers, reflected in nuclear properties and in the observed solar abundances, had puzzled physicists for a long time. In 1949, Maria Goeppert Mayer came up with a brilliant solution: couple the nucleon spin with the orbital parameter. She began her studies in Mathematics before pursuing a PhD in Physics, which she obtained in 1930 at the University of Göttingen. After marrying, she moved to the United States where her husband had accepted a position at Johns Hopkins University. Strict rules against nepotism prevented the university from also hiring her as a faculty member and she was given a job as an assistant. When the couple moved to Columbia University, Maria was allowed to have an office, but received no salary. Later, she was paid to work for the Manhattan project, holding positions also at the University of Chicago and Argonne National Laboratory. In 1960 she was appointed Professor of Physics at UC San Diego. For her discoveries concerning nuclear shell structure, Professor Mayer won the Nobel Prize in 1963 with Hans Jensen and Eugene Wigner.



FUN FACTS

- When Maria Mayer won the Nobel Prize, a local news headline reported: “San Diego Housewife Wins Nobel Prize”.
- The unit for the two-photon absorption cross-section is named the Goeppert-Mayer (GM) unit in recognition of the work Maria did for her Ph.D. thesis.

“My father said: Don’t grow up to be a woman, and what he meant by that was, a housewife ... without any interests.” –Maria Goeppert Mayer

Art: The Fabric of Space-Time - Cosmic Microwave Background

May 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
26	27	28	29	30	1	2
3	4	5	6	7	8	9
Early May bank holiday						
10	11	12	13	14	15	16
1900 - Anniversary of the birth of Cecilia Payne Gaposchkin					International Day of Families (A/RES/47/237)	International Day of Living Together in Peace (A/RES/72/130) International Day of Light [UNESCO] (UNESCO 39 C/Resolution 16)
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	<p>April '21</p> <p>M T W T F S S</p> <p>1 2 3 4</p> <p>5 6 7 8 9 10 11</p> <p>12 13 14 15 16 17 18</p> <p>19 20 21 22 23 24 25</p> <p>26 27 28 29 30</p>	<p>June '21</p> <p>M T W T F S S</p> <p>1 2 3 4 5 6</p> <p>7 8 9 10 11 12 13</p> <p>14 15 16 17 18 19 20</p> <p>21 22 23 24 25 26 27</p> <p>28 29 30</p>	Notes			
Spring bank holiday						

Toshiko Yuasa

1909-1980

"The roots of the sciences come from the broad, abundant feeling of love." – Toshiko Yuasa

Toshiko Yuasa was the first woman nuclear physicist in Japan. She graduated in 1934 from Tokyo Bunrika University where she specialised in spectroscopy and in 1939; she won a prestigious French scholarship. After a month of sailing, she arrived in Paris to start working with Frédéric Joliot-Curie on artificial radioactivity. In 1943, Toshiko was awarded a PhD from the Collège de France on the continuous beta-ray spectrum in artificial radioactive material. As a Japanese national she was forced to evacuate to Berlin in 1944, where she worked only for a few months building a double spectrometer before returning to Japan. Because nuclear research was banned in Japan after the war, she could not continue her academic career there and in 1949, she came back to France to continue her research at CNRS. In 1956, Toshiko published an article warning about the dangers of hydrogen bomb testing at Bikini Atoll. In 2012, Ochanomizu University established a scholarship in her name, supporting Japanese women to study abroad.



FUN FACTS

- Toshiko Yuasa moved to France after WW II and worked at the CNRS. During the time there, she filed two patent applications, one for a "Calculation rule in particular for radioactivity measurements" and one for a "stereo-camera."
- Nineteen years after receiving a PhD in France, Toshiko Yuasa earned a second doctorate in Japan from Kyoto University.

Art: The Fabric of Space-Time – Supernova II

June 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
31	1	2	3	4	5	6
7	8	9	10 1923 - Anniversary of the birth of Erika Helga Ruth Bohm-Vitense	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
International Day of the Celebration of the Solstice (A/RES/73/300) Summer Solstice 0332 UTC	28	29	30	1	2	3
1906 - Anniversary of the birth of Maria Goeppert Mayer			International Asteroid Day (A/RES/71/90)			4
May '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	July '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Georgeanne Robertson Caughlan

1916-1994

Professor Caughlan was referred to as "Jan" by her friends and colleagues.

At the core of nuclear astrophysics are the rates at which nuclei inside stars combine to produce new nuclei. Not surprisingly, such information is one of the most sought after in the community. Jan's very first efforts to provide extensive compilations of nuclear reaction rates based on current experimental information resulted in some of the most famous papers in the field. As a Research Fellow, she worked with Wm. A. Fowler on the problem of energy generation in stars. Jan's job was to study the experimental data for the reactions important for stars in order to derive their rates. Interestingly, Jan's career followed a very nontraditional path. After receiving her baccalaureate degree in Physics she decided to dedicate herself to raising her five children. Later on, she went back to Physics, obtained her PhD at the age of forty eight, and became Professor at the age of fifty eight. At Montana State University, Professor Caughlan served as Acting Dean of the Graduate College and Interim Acting Vice-President for Academic Affairs.



FUN FACT

"William A. Fowler expressed his indebtedness to Jan for her role in the theoretical part of studies of the reactions important to nucleosynthesis for which he received his Nobel Prize in Physics." – Barbara Zimmerman

Art: The Fabric of Space-Time – Reflection Nebula with Dust Lanes

July 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	1	2	3	4
						1934 - Anniversary of the death of Maria Salomea Skłodowska Curie
5	6	7	8	9	10	11
12	13	14	15	16	17	18
Battle of the Boyne Orangemen's Day(Northern Ireland)						
19	20	21	22	23	24	25
					1995 - Anniversary of the death of Edith Alice Muller	
26	27	28	29	30	31	1
June '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	August '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Edith Alice Müller

1918-1995

“The Scientific community ... recognized Edith as a great professor, astronomer, and organizer. Her human qualities, kindness, and availability for her students and colleagues, her pioneering work as a woman in the field of astronomy, her open mind and courage were unanimously appreciated ...” – André Maeder

Edith Alice Müller was born in Madrid of Swiss parents. She finished her studies at ETH Zurich and obtained her PhD in mathematics in 1943. She worked in Zurich, Cambridge (UK), Ann Arbor (USA), Neuchatel and Geneva, becoming full professor in 1972. Edith worked both on the observation and theory of the solar atmosphere. In 1960, while at Ann Arbor, with her collaborators L. Goldberg and L. H. Aller she published an extremely influential paper on “The Abundances of the Elements in the Solar Atmosphere”. With more than 430 citations, the paper remained the standard for the following 20 years. Edith was fluent in English, French, German, and Spanish and the first woman to be appointed General Secretary of the International Astronomical Union (IAU). She played an important role in promoting Astrophysics and international scientific cooperation. The “Edith Alice Müller Award” had been granted to an outstanding PhD thesis in Switzerland for the first time in 2018 in recognition of Professor Müller’s scientific research on the composition of the Sun and for her involvement in promoting Astrophysics internationally.



FUN FACT

Prof. Edith Müller was a Swiss Mathematician and Astronomer who studied the mathematics in Islamic design. Her Ph.D. dissertation titled “Application of Group Theory and Structural Analysis to the Moorish Adornments of the Alhambra in Granada” became a key piece of art literature in the study of Islamic design.

Art: The Fabric of Space-Time – Planetary Nebula

August 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday																																																																																			
26	27	28	29	30	31	1																																																																																			
2	3	4	5	6	7	8																																																																																			
9	10	11	12	13	14	15																																																																																			
16	17	18	19 <small>1919 - Anniversary of the birth of E. Margaret Peachey Burbidge</small>	20	21	22																																																																																			
23	24	25	26	27	28	29																																																																																			
30	31	<p>July '21</p> <table border="1"> <tr><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td><td>S</td></tr> <tr><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td></td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td></td></tr> </table>		M	T	W	T	F	S	S			1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		<p>September '21</p> <table border="1"> <tr><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td><td>S</td></tr> <tr><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td></tr> <tr><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td>27</td><td>28</td><td>29</td><td>30</td><td></td><td></td><td></td></tr> </table>	M	T	W	T	F	S	S			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				Notes
M	T	W	T	F	S	S																																																																																			
		1	2	3	4																																																																																				
5	6	7	8	9	10	11																																																																																			
12	13	14	15	16	17	18																																																																																			
19	20	21	22	23	24	25																																																																																			
26	27	28	29	30	31																																																																																				
M	T	W	T	F	S	S																																																																																			
		1	2	3	4	5																																																																																			
6	7	8	9	10	11	12																																																																																			
13	14	15	16	17	18	19																																																																																			
20	21	22	23	24	25	26																																																																																			
27	28	29	30																																																																																						
<small>Summer bank holiday</small>						<small>International Day against Nuclear Tests (A/RES/64/35)</small>																																																																																			

E. Margaret Peachey Burbidge

1919-2020

"[Margaret] is one of the Giants of the transformation of astronomy in the 20th century into a major branch of physics". – G. Fuller, UC San Diego

Margaret Burbidge had played a central role in shaping the field of nuclear astrophysics. She had been a pioneer all her life, as a scientist and as a woman scientist. Since childhood, she was fascinated by stars and excessively large numbers. Her interests merged upon reading Sir James Jeans' books on astronomy. She received her PhD from the University of London Observatory in 1943. Her early research focused on chemical abundances in stars. Margaret entered the field of astronomy in the 1940s when it had virtually no women, and in 1945 she was turned down for a Carnegie Fellowship due to her gender. Thanks to her influence, women can observe at any American observatory today. The landmark 1957 paper by M. Burbidge, Burbidge, Fowler, and Hoyle: "Synthesis of the Elements in Stars" thrust the theory of stellar nucleosynthesis into the scientific spotlight. For her pioneering research, Margaret has received 12 honorary degrees and numerous honors, including being a Fellow of the Royal Society of London. Prof. Burbidge has also held many leadership positions, including being the first woman president of the American Astronomical Society and the first director of the Center for Astrophysics and Space Sciences (CASS) at UC San Diego.



"If frustrated in one's endeavor by a stone wall or any kind of blockage, one must find a way around - another route towards one's goal." – a guiding principle formulated by Margaret Peachey Burbidge, 1945.

FUN FACTS

- Margaret helped develop some of Hubble Space Telescope's original instruments.
- In 1960, Asteroid 5490 Burbidge was named to honor Margaret Burbidge.

Art: The Fabric of Space-Time – He Flash on a Companion Star

September 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
August '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	October '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Erika Helga Ruth Böhm-Vitense

1923-2017

Erika Böhm-Vitense was the first scientist to accurately describe convective mixing in stellar interiors using a prescription that has been widely adopted for half a century now in all stellar evolutionary codes. Her 1958 paper, written in German, is a crucial contribution to the “mixing-length” theory of stellar convection. The paper has been cited more than 1200 times; seventy, of which occurred in 2017. Erika was born in Kurau, Germany, and she obtained her doctoral degree in 1951 in Kiel. In the 1960s and 1970s she combined theory and observations in optical studies of a large variety of objects: from helium stars, to supergiants and open clusters, to name a few. In 1968 she moved to the USA with her husband where she obtained a senior research associate position at the University of Washington and she became a Professor in 1971. Prof. Böhm-Vitense received many awards for her scientific works, including the Annie Jump Cannon Prize from the American Astronomical Society in 1965 and the Karl Schwarzschild Medal from the Astronomische Gesellschaft in 2003.



FUN FACT

Erika produced a three-volume set of textbooks entitled: Introduction to Stellar Astrophysics. Volume 1) basic stellar parameters, Volume 2) stellar atmospheres, and Volume 3) stellar interiors.

Art: The Fabric of Space-Time – Disk of Dust and Gas

October 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
27	28	29	30	1	2	3
4	5	6	7	8	9	10
	World Teachers' Day [UNESCO] (27 C/INF.7)					
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1916 - Anniversary of the birth of Georgianne R. Caughlan		1968 - Anniversary of the death of Lise Meitner				
September '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	November '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Notes				

Dilhan Ezer Eryurt

1926-2012

Dilhan Eryurt was born in Izmir. After graduating from the Department of Mathematics and Astronomy of Istanbul University, Dilhan completed her doctorate in Astronomy at Ankara University in 1953. She moved to Canada and collaborated with A. G. W. Cameron, modelling protostellar evolution of gas/dust clouds. Their models offered compelling evidence for Hayashi's ground-breaking work that provides a theoretical basis for star formation. Later, she worked at Indiana University, NASA's Goddard Space Flight Center, and the University of California. While at NASA, she was the only woman astronomer working at the institution. She received the Apollo Achievement Award in 1969 for her contributions to the first landing on the Moon project. Meanwhile, she organized the first National Astronomy Congress in Turkey. She founded the Astrophysics branch within the Physics Department at the Middle East Technical University, later becoming the Chair of the Department and the Dean of the Faculty. Professor Ezer Eryurt is regarded as the mother of Astronomy in Turkey, where her life dedicated to science has left a tremendous legacy.



FUN FACT

Dilhan Ezer Eryurt bequeathed all of her assets to the Directorate of National Education in Turkey for the construction of a kindergarten and girl's dormitory.

Art: The Fabric of Space-Time – Deep Field

November 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	2	3	4	5	6	7 1867 - Anniversary of the birth of Marie Skłodowska Curie 1878 - Anniversary of the birth of Lise Meitner
8	9	10 World Science Day for Peace and Development (UNESCO 31C/Resolution 20)	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29 1926 - Anniversary of the birth of Dilhan Ezer Eryurt	30 St Andrew's Day (Scotland)	1	2	3	4	5
October '21 M T W T F S S 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	December '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				

Beatrice Muriel Tinsley

1941-1981

Beatrice Tinsley was a true pioneer of the chemical evolution of galaxies. In her 1980 review article on "Evolution of the Stars and Gas in Galaxies" we find a brilliant explanation of the modelling of galaxies and beautiful predictions, which we still discuss today using data from large telescopes and fast supercomputers. Her family emigrated from England to New Zealand when she was young and she made up her mind to become an astrophysicist at the age of 14. In 1963 she moved to the United States. With her PhD dissertation awarded by the University of Texas in 1967, she started her journey into achieving international fame as a cosmologist. Beatrice was the first to show that contrary to expectations, the universe will never collapse, but will always continue its expansion. In 1978, she became the first female Professor of Astronomy at Yale University. Her shining career was snuffed out prematurely when she died from cancer at the age of 40. Professor Tinsley's research continues to be developed today.



FUN FACTS

- Beatrice played violin in the New Zealand National Youth Orchestra while in High School.
- Mount Tinsley, a mountain in Fiordland, New Zealand was named in her honor. It is located in the Kepler Mountain range, height 1537 m, 15 km west of Te Anau in Manapouri, GR.
- Asteroid 3087 Beatrice Tinsley, a minor planet, discovered at Mt John Observatory, New Zealand in 1981 was named for her.
- The University of Canterbury dedicated the Beatrice Tinsley Building for New Zealand Astronomy and Astrophysics in her honor.

"Let me be like Bach, creating fugues
Till suddenly the pen will move no more.
Let all my themes within – of ancient light
Of origins and change and human worth –
Let all their melodies still intertwine,
Evolve and merge with growing unity,
Ever without fading
Ever without a final chord ...
Till suddenly my mind can hear no more."

-Beatrice Tinsley

Art: The Fabric of Space-Time – Spiral Galaxy

December 2021



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	1	2	3	4	5
6	7 <small>1979 - Anniversary of the death of Cecilia Payne Gaposchkin</small>	8	9	10	11	12
13	14	15	16	17	18	19
20	21 <small>Winter Solstice 1659 UTC</small>	22	23	24	25	26
27	28	29	30	31	1	2
<small>Christmas Day (substitute day)</small>	<small>Boxing Day (substitute day)</small>					
November '21 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	January '22 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Notes				