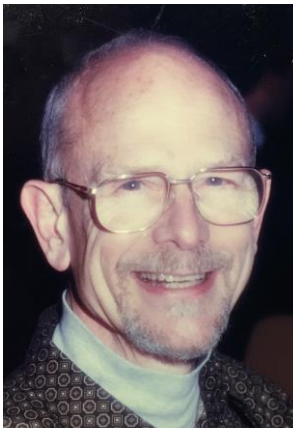
EXTENDED CURRICULUM VITAE
Professor Douglas G. Currie



EDUCATION

Bach. of Engineering Physics,	Cornell University, Ithaca, NY,	1958
Ph.D. in Theoretical Physics,	University of Rochester, Rochester, NY,	1962
NSF PreDoctoral Scholar,	University of Rochester, Rochester, NY,	1959-1964
NSF Post Doctoral Scholar,	Princeton University, Princeton, NJ	1964-1965
NSF Post Doctoral Scholar,	University of Maryland, College Park, MD	1965-1966

PROFESSIONAL EXPERIENCE

1999-present: Professor Emeritus, University of Maryland, College Park
1999-present: Senior Research Scientist, University of Maryland, College Park
2002-2003: Senior Scientist, University of California at San Diego, San Diego, CA
1999-2001: Senior Scientist, European Southern Observatory, Garching, Germany
1976-1999: Professor of Physics, University of Maryland, College Park
1970-1976: Associate Professor of Physics, University of Maryland, College Park
1967-1970: Assistant Professor of Physics, University of Maryland, College Park
1965-1967 Visiting Assistant Professor of Physics, University of Maryland, College Park
1964-1967: Assistant Professor of Physics, Northeastern University, Boston, MA
1963-1964: NSF Post-Doctoral Fellow, Physics Department University of Maryland College Park
1962-1963: NSF Post-Doctoral Fellow, Physics Department, Princeton University, Princeton, NJ
1957-1958: Instructor, Engineering Physics Department, Cornell University, Ithaca, NY

SELECTED HONORS AND AWARDS

NASA Team Recognition for Lunar Laser Ranging Programs
NASA Team Award for Wide Field/Planetary Camera for the Hubble Space Telescope

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

American Astronomical Society
American Geophysical Union
Society of Photographic Instrumentation Engineering (SPIE)
International Astronomical Union

RESEARCH

During his graduate studies, Professor Currie formulated and proved the "No-Interaction Theorem"[1], a study of the role of classical particle interactions in a relativistic framework. He further developed the extension of this Hamiltonian approach into his "Canonoid Transformations"[7]. These topics are the subject of current ongoing investigations within the international professional community. At the Bell laboratories, addressed the nature of laser radiation[40]. At the University of Maryland, College Park he was a key participant in developing the Apollo Retroreflectors [2,3,4,5,8] and developed and operated the initial Lunar Laser Ranging Station at McDonald Observatory[6]. Concerning unique new instrumentation in astrometry, he developed "Amplitude Interferometry[10,11] a technique to obtain resolution at the diffraction limit on large astronomical telescopes, primarily at the 200" at Mount Palomar and 100" at Mt. Wilson. This technique provided resolution to determine the diameter on a variety of stars at many wavelengths[10,13]. He also developed the "Two Color Refractometer[12] which analyzed unresolved binary stars and then provided the basis for a space navigation system that operated at the meter level. He developed CCD systems to determine Astrometric Position for to a significantly higher accuracy than the existing state-of-the-art for the USAF/GGS. As a member of the team of Astronomers and Astrophysicists that proposed, built and operated the Wide Field/Planetary Camera[12,13,15,19,23,24,25], he participated in the development of the main camera of the Hubble Space Telescope and analyzed the resultant observations. Professor Currie accepted a position at the European Southern Observatory (ESO) to develop software to process the Adaptive Optics data obtained on the 3.6 meter telescope at La Silla, Chile and the Very Large Telescope (VLT) at Paranal, Chile[18,19]. The development of this software continued during his tenure as a visiting scientist at the University of California, San Diego. He was a principle in the development of navigation concepts for DARPA's F6 program[35]. For the past fifteen years, he has been directing the development of the Next Generation Retroreflectors for Lunar Laser Ranging (a.k.a. The Lunar Laser Ranging Retroreflector for the 21st Century – LLRRA-21)[27,30]. This program has addressed the design and simulation of the thermal behavior[32], of the role of dust[31] and of the limiting effect of the earth's atmosphere[33,36] and advanced deployment technologies[29]. This has included the development of a state of the art facility for thermal/vacuum testing of retroreflector payloads at the INFN-LNF[28] in Frascati, Italy. The LLRRA-

21s were to be carried to the moon by Moon Express, a commercial space-faring corporation[37]. Recently the University of Maryland, with INFN-LNF, signed an agreement with Moon Express to deploy four NGRs on the lunar surface, starting in early 2017[38,37]. He is now the Principal Investigator for the NASA selection of the University of Maryland, College Park to create and deliver three NGLRs for deployment on the Moon. The first deployment, that will be carried by the Blue Ghost lander by developed by the Firefly Aerospace, is manifest for launch in early 2024[42]. He has also worked with a program of ionospheric tomography to provide forecasts of earthquakes[34].

During his extended scientific career, he also consulted for a variety of government and commercial entities. This work included several projects related to remote sensing and intelligence aspects with the USG, quick blood analysis, bromate detection in bread with FDA [41], developing systems to land aircraft in dense fog[17,18].

SELECTED RELEVANT PUBLICATIONS

1 Currie, D. G.; Jordan, T. F.; Sudarshan, E. C.
Relativistic Invariance and Hamiltonian Theories of Interacting Particles
Reviews of Modern Physics, vol. 35, Issue 2, pp. 350-375 (1963)

2 Alley, C. O.; **Currie, D. G**.
Laser Beam Pointing Tests Surveyor Program Results.
NASA SP-18, 425 pages, published by NASA, Washington, D.C., 1969, p.397 (1969)

3 Alley, C. O.; Chang, R. F.; **Currie, D. G.;** Mullendore, J.; Poultney, S. K.; Rayner, J. D.; Silverberg, E. C.; et. al
Apollo 11 Laser Ranging Retro-Reflector: Initial Measurements from the McDonald Observatory
Science, 167, 3917, 368 . (1970a)

4 Alley, C. O.; Chang, R. F.; **Currie, D. G.;** Poultney, S. K.; Bender, P. L.; Dicke, R. H.; Wilkinson, D. T.; et. al
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Science, Volume 167, Issue 3918, pp. 458-460 (Sci Homepage) (1970b)

5 Chang, R. F**., Currie, D. G.,** Alley, C. O. and Pittman, M. E.
Far-Field Diffraction Pattern for Corner Reflectors with Complex Reflection Coefficients
Journal of the Optical Society of America, vol. 61, issue 4, p.4311971 (1971)

6 Silverberg, E. C.; **Currie, D. G**.
Performance of the laser-ranging system at McDonald Observatory.
Journal of Optics Soc. America, Vol. 61, p. 692 – 693 (1971)

7 Currie, D. G.; Saletan, E. J.
Canonical transformations and quadratic Hamiltonians
Il Nuovo Cimento B, vol. 9, issue 1, pp. 143-153 (1972a)

8 Chang, R. F.; Alley, C. O.; **Currie, D. G.;** Faller, J. E.
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Space Research XII, Vol. 1, p. 247 – 259 (1972b)

9 Bender, P. L.; **Currie, D. G.;** Dicke, R. H.; Eckhardt, D. H.; Faller, J. E.; Kaula, W. M.; Mulholland, J. D.; et. al
The Lunar Laser Ranging Experiment,"
Science, 182, 4109, 229-238. (1973)

10 Currie, D. G.; Knapp, S. L.; Liewer, K. M.
Four stellar-diameter measurements by a new technique: amplitude interferometry.
Astrophysical Journal, Vol. 187, p. 131 - 134 (1974)

11 Frieden, B. Roy; **Currie, Douglas G.**
Unfolding the autocorrelation function (A) –
J. Opt. Soc. Am., vol. 66, page 1111 (1976)

12 Baum, W. A.; Kreidl, T.; Westphal, J. A….. **Currie, D. G**.
Saturn's E ring

Icarus, vol. 47, July 1981, p. 84-96.

13 Currie, D. G.; Wellnitz, D. D.
Theory and operation of the two-color refractometer.
Publications de l'Observatoire Astronomique de Beograd, No. 35, p. 177 (1987a)

14 Currie, Douglas G.
University of Maryland program on multi-aperture amplitude interferometry
Digital image recovery and synthesis; Proceedings of the Meeting, SPIE, 1987, p. 102-107. (1987b)

15 Lauer, Tod R.; Faber, S. M.; **Currie, Douglas G.;** et. al
Planetary camera observations of the central parsec of M32
Astronomical Journal (ISSN 0004-6256), vol. 104, no. 2, Aug. 1992, p. 552-562.

16 Rubincam, David Parry; **Currie, Douglas G.;** Robbins, John W
LAGEOS I once-per-revolution force due to solar heating
J. of Geophysical Research, Volume 102, p. 585-590 (1997)

17 Norris, Victor J., Jr.; Evans, Robert S.; **Currie, Douglas G.**
Performance comparison of visual, infrared, and ultraviolet sensors for landing aircraft in fog
Proceedings of the SPIE, Volume 3691, p. 2-20 (1999).

18 Norris, Victor J., Jr**.; Currie, Douglas G.**
Autonomous UV-enhanced-vision system for landing on CAT I runways during CAT IIIa weather conditions
Proceedings of the SPIE, Volume 4363, p. 9-20 (2001).

19 Currie, D.; Le Mignant, D.; Svensson, B.; Tordo, S.; Bonaccini, D.
3D Structure and Dynamics of the Homunculus of Eta Carinae: an Application of the Fabry-Perot, ADONIS and AO Software. I. Motions in Homunculus.
The Messenger, vol. 101, p. 24-27 (2000a)

20 Currie, D.; Bonaccini, D.; Diolaiti, E.; Tordo, S.; Naesgarde, K.; Liwing, J.; Bendinelli, Close, L. et. al
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The Messenger, vol. 100, p. 12-23 (2000)

21 Diolaiti, E.; Bendinelli, O.; Bonaccini, D.; Close, L.; **Currie, D.;** Parmeggiani, G.
Analysis of isoplanatic high resolution stellar fields by the StarFinder code
Astronomy and Astrophysics Supplement, v.147, p.335-346 (2000b)

22 Currie, D.; Kissell, K.; Shaya, E.; Avizonis, P.; Dowling, D.; Bonaccini, D.
Star formation in NGC 6611 with ADONIS and Hubble.
The Messenger, vol. 86, p. 31-36 (2000c)

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The ``Ghost Shell'': Discovery of the Forward Shock from Colliding Winds about Eta Carinae
Revista Mexicana de Astronomía y Astrofísica Vol. 15, pp. 70-70 (2003)

25 Dorland, B. N**; Currie, D. G,** Hajian, A "
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26 AndréS, J. I.; Noomen, R.; Bianco, G.; **Currie, D. G**.; Otsubo, T.
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27 Currie, D; Dell'Agnello, S.; Delle Monache, G.
A Lunar Laser Ranging Retroreflector Array for the 21st Century
Acta Astronautica, v. 68, iss. 7-8, p. 667-680 (2011a)

28 Dell'Agnello, S.; Delle Monache, G. O.; Currie, D. G.; et. al
Creation of the new industry-standard space test of laser retroreflectors for the GNSS and LAGEOS
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29 Zacny, K.; **Currie, D.;** Paulsen, G.; Szwarc, T.; Chu, P.
Development and testing of the pneumatic lunar drill for the emplacement of the corner cube reflector on the Moon
Planetary and Space Science, Volume 71, Issue 1, p. 131-141. (2012)

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A Lunar Laser Ranging Retroreflector Array for the 21st Century
Nuclear Physics B Proceedings Supplements, Volume 243, p. 218-228. (2013a)

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Thermal Analysis of Lunar Corner Cube Retro-Reflectors
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33 Currie, Douglas G.; Prochazka, Ivan
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Proceedings of the SPIE, Volume 9224, id. 92240C 8 pp. (2014a).

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Formation flying, cosmology and general relativity: A tribute to far-reaching dreams of Mino Freund
Springer Proceedings in Physics , vol. 150 (2014c)

36 Douglas Currie, Ivan Prochazka,
Lunar laser ranging and limits due to the Earth's atmosphere,
Proceedings of SPIE Vol. 9614, 96140C (2015)

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On ``Diagonal" Coherent-State Representations for Quantum-Mechanical Density Matrices
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