Obituary: Daniel R. Hughes (1927–2012)

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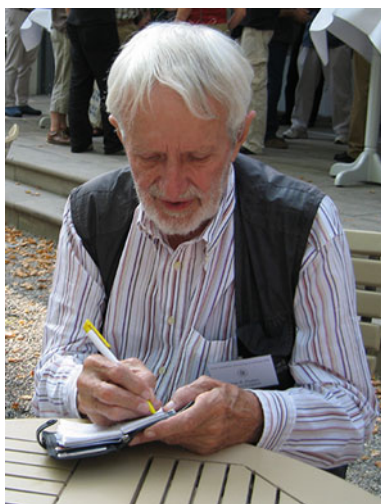
Professor Daniel R. Hughes, one of the most eminent and influential mathematicians working in Finite Geometries, Designs, and Finite Groups, passed away unexpectedly on 19th October,

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2012. This journal had honoured him on the occasion of his 80th birthday on 7th August, 2007 with a special issue (Volume 44) for which we were the guest editors; it consisted of 28 papers and was the result of a truly enthusiastic response to our invitations to help celebrating Dan's special birthday. The volume was officially presented to Professor Hughes during the *Giornata di Combinatoria per festeggiare gli 80 anni di Dan Hughes* at the University of Rome "La Sapienza" on 31st January, 2008. Now it is our sad duty to provide this obituary, which is based on our preface to that volume.

Dan Hughes was born on 7th August, 1927, in Cincinnati, USA, but has been based in Europe for more than half of his life, holding dual citizenship of the USA and the UK. After completing a B.Sc. in Physics and an M.A. in Mathematics at the University of Maryland, he did his doctoral studies at the University of Wisconsin under the supervision of R.H. Bruck, where he received his Ph.D. in 1955. After various academic appointments in the USA (University of Wisconsin, Ohio State University, University of Chicago, and University of Michigan), he moved to Westfield College, University of London, in 1964, where he served first as a Reader and then, from 1967 to 1982, as a Professor; when Westfield closed as a separate college, he transferred to Queen Mary and Westfield College, where he continued as Professor until his retirement in 1992. After that, he mostly spent his time in Italy, more precisely, in Tuscany, near Torrita di Siena. Dan died in Hospital in Siena, one day after a fall that led to some major internal bleeding in his head. He is buried in Torrita, where the funeral ceremony took place on 26th October, 2012.

Dan's role in Finite Geometries, Designs, and Finite Groups can hardly be over-estimated. The written part of his influence consists of about forty research publications. To just mention two concepts that bear his name, there are the Hughes–Thompson groups and the Hughes planes. There are also two standard text books, jointly written with F.C. Piper, *Projective Planes* (Springer, 1973) and *Design Theory* (Cambridge University Press, 1985). We provide a list of his publications below. Equally important is his personal influence on a multitude of younger researchers, among them his nine Ph.D. students during his time at the University of London: Marion Kimberley, Robert Burn, Vassili Mavron, Vikram Jha, Susan P. O'Gorman, Peter Wild, Mohammad Sadegh Montakhab, Paul Fisher, and Dina Ghinelli.

However, Dan's influence extended far beyond those researchers who were officially his students. On the one hand, this is due to his numerous research visits, in particular, repeated visiting positions at the University of Rome and, in his own words, "many short leaves, sabbatical and (mostly) otherwise, of one to 6 months in very many parts of the world, too numerous to list here". On the other hand, he always had a constant stream of visitors in London, and he also shaped the progress of Finite Geometries and Designs by organising important research meetings, namely sixteen Oberwolfach conferences in Germany, from 1968 to 1993, and three Isle of Thorns conferences in England in 1975, 1980, and 1990. Last but not least, there are the many invited talks at major international conferences.

While the first author of this obituary was Dan's last Ph.D. student, the third author would like to mention his own personal example: even though Dan never played any official role in his career, his two extended visits to Westfield during the third year of his studies and after his Ph.D. were of paramount importance. Apart from his stimulating lectures, discussing mathematics with Dan at the blackboard was sheer magic, a totally new experience for him. These visits hugely influenced the topics he worked on and also the style of his research. He actually considers Dan as his major mathematical inspiration.

Finally, it only remains to express our lasting gratitude to and appreciation of Dan. It is certain that his scientific legacy will stay alive for many years to come, and that he will be

fondly remembered by a multitude of people, mathematicians and non-mathematicians alike, whose lives were enriched by knowing him.

Publications of Daniel R. Hughes:

1. Planar Division Neo-rings, Ph.D. Thesis, University of Wisconsin, Madison (1955).
2. A note on difference sets. Proc. Am. Math. Soc. **6**, 689–692 (1955).
3. Planar division neo-rings. Trans. Am. Math. Soc. **80**, 502–527 (1955).
4. Additive and multiplicative loops of planar ternary rings. Proc. Am. Math. Soc. **6**, 973–980 (1955).
5. Partial difference sets. Am. J. Math. **78**, 650–674 (1956).
6. Regular collineation groups. Proc. Am. Math. Soc. **8**, 165–168 (1957).
7. A class of non-Desarguesian projective planes. Can. Math. Soc. **9**, 378–388 (1957).
8. A note on some partially transitive projective planes. Proc. Am. Math. Soc. **8**, 978–981 (1957).
9. Collineations and generalized incidence matrices. Trans. Am. Math. Soc. **86**, 284–296 (1957).
10. Generalized incidence matrices over group algebras, Ill. J. Math.**1**, 545–551 (1957).
11. (with J.G. Thompson) The H_p-problem and the structure of H_p-groups, Pac. J. Math. **9**, 1097–1101 (1959).
12. Collineation groups of non-Desarguesian planes. I. The Hall Veblen–Wedderburn systems. Am. J. Math. **81**, 650–674 (1959).
13. Review of some results in collineation groups. Proc. Symp. Pure Math. **1**, 42–55 (1959).
14. Collineation groups of non-Desarguesian planes. II. Some seminuclear division algebras. Am. J. Math. **82**, 113–119 (1960).
15. (with E. Kleinfeld) Seminuclear extensions of Galois fields. Am. J. Math. **82**, 389–392 (1960).
16. On homomorphisms of projective planes. Proc. Symp. Appl. Math. **10**, 45–52 (1960).
17. Recent publications: finite mathematical structures. Am. Math. Monthly **67**, 936–937 (1960).
18. (with D. Gorenstein) Triply transitive groups in which only the identity fixes four letters. Ill. J. Math. **5**, 486–491 (1961).
19. Combinatorial analysis, t-designs and permutation groups, Proc. Symp. Pure Math. **6**, 39–41 (1962).
20. Some results in collineation groups. Algebraical and topological foundations of geometry. Proceedings of Colloquium Utrecht 1959, pp. 69–70. Pergamon, New York (1962).
21. Sottopiani non-Desarguesiani di piani finiti. Atti Accad. Naz. Lincei, VIII. Ser. Rend. Cl. Sci. Fis. Mat. Nat. **36**, 315–318 (1964).
22. On k-homogeneous groups. Arch. Math. **15**, 401–403 (1964).
23. (with P. Dembowski) On finite inversive planes. J. Lond. Math. Soc. **40**, 171–182 (1965).
24. Extensions of designs and groups: projective, symplectic and certain affine groups. Math. Z. **89**, 199–205 (1965).
25. (with M.V.D. Burmester) On the solvability of autotopism groups. Arch. Math. **16**, 178–183 (1965).
26. On t-designs and groups. Am. J. Math. **87**, 761–778 (1965).
27. Pappus and Pascal: Bol quasifields. Proceedings of the Project Geometry Conference Chicago, pp. 48–51. University of Illinois Press, Chicago (1967).

28. Peter Dembowski, Jahresber. Dtsch. Math. Ver. **74**, 93–95 (1972/1973).
29. (with F.C. Piper) Projective Planes, x + 291 pp. Springer, Corr. 2nd printing 1982, New York, (1973).
30. Free closures and related topics. Proceedings of International Conference on Projective Planes, pp.107–113. Washington State University Press, Pullman, (1973).
31. (with F.C. Piper) On resolutions and Bose's theorem. Geom. Ded. **5**, 129–133 (1976).
32. Biplanes and semi-biplanes, Combinatorial Mathematics, Canberra 1977. Springer Lecture Notes in Mathematics, vol. 686, pp. 55–58. Springer, Berlin (1978).
33. (with M.J. Kallaher) On the Knuth semifields. Int. J. Math. Math. Sci. **3**, 29–45 (1980).
34. On Designs,Geometries and Groups. Springer Lecture Notes in Mathematics, vol. 893, pp.43–67. Springr, Berlin (1981).
35. (with P.J. Cameron and J.W.P. Hirschfeld, editors), Finite Geometries and Designs, Isle of Thorns 1980. Cambridge University Press, New York (1981).
36. A combinatorial construction of the small Mathieu designs and groups. Algebraic Geom. Combin. Ann. Discret. Math. **15**, 259–264 (1982).
37. Semi-symmetric 3-designs. Finite Geometries, Pullman 1981. Dekker Lecture Notes in Pure Applied Mathematics, vol. 82, pp. 223–235. Springer, Berlin (1983).
38. On the non-existence of a semi-symmetric 3-design with 78 points, Combinatorics '81, Rome 1981. Ann. Discret. Math. **18**, 473–479 (1983).
39. (with F.C. Piper) Design Theory, viii + 240 pp. Cambridge University Press (second edition 1988), Cambridge, (1985).
40. (with P.J. Cameron and A. Pasini) Extended generalized quadrangles. Geom. Ded. **35**, 193–228 (1990).
41. (with S.A. Hobart) Extended partial geometries: nets and dual nets. Eur. J. Combin. **11**, 357–372 (1990).
42. Extended partial geometries: dual 2-designs. Eur. J. Combin. **11**, 459–471 (1990).
43. (with N.M. Singhi) Partitions in matrices and graphs. Eur. J. Combin. **12**, 223–235 (1991).
44. On some rank 3 partial geometries. In: Advances in Finite Geometries and Designs, Isle of Thorns 1990 pp. 195–225. Oxford University Press, Oxford (1991).
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46. (with A. Del Fra and D. Ghinelli) Extended partial geometries with minimal μ. Geom. Ded. **42**, 119–128 (1992).
47. (with S.A. Hobart) EpGs with minimal μ. II, Geom. Ded. **42**, 129–138 (1992).
48. Partial geometries of rank n, Combinatorics '90, Gaeta 1990. Ann. Discret. Math. **52**, 249–258 (1992).