

1116-R1-149 **Yves Nievergelt*** (ynievergelt@ewu.edu), Eastern Washington University, Department of Mathematics, 216 Kingston Hall, Cheney, WA 99004-2418. *Complex Arithmetic Boot Camp*.

Connections between complex arithmetic and other applied or theoretical fields help draw students' attention to complex analysis from the start.

An in-class exercise asks students to find a formula that involves not four but only three real multiplications to multiply two complex numbers. In such an exercise, students' activities are related to two yet unsolved problems: the search for a faster multiplication and inversion of matrices, and a proof that Gaussian elimination with partial pivoting is probabilistically backward stable, for which Lloyd N. Trefethen (The Smart Money's on Numerical Analysts, *SIAM News*, November 2012) offers \$100 and \$1000 rewards.

After more preparation with complex division, square roots, and cube roots, a small project asks students to supply and verify omitted arithmetic steps in Isaac Sofair's quartic "Improved Method for Calculating Exact Geodetic Latitude and Altitude" (*J. Guidance, Control, and Dynamics*, July–August 1997), which is used by NASA (Karlgaard et al., *J. Spacecraft and Rockets*, May 2013, <http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20110011138.pdf>).

More activities and applications are in UMAP Modules 743, 805, 806, 807. (Received August 07, 2015)