national association of mathematicians

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IN THE NEWS

A Black mathematician solves the famous 3x+1 problem (see article "The 3x+1 problem Solved").

Jonathan David Farley gave the 2004 NAM CLAYTOR-WOODARD LECTURE: *Captain Carib's Daring Escape, the Linear Extensions of a Ranked Poset, and a Problem of Richard Stanley from 1981*. (see the article "Mathematician for the People").

African American holds a Gibbs Professorship at Yale University. Daniel Krashen earned his Ph.D. in Algebraic Geometry from the University of Texas at Austin in 2001. From 2001until 2003, Dr. Krashen was a Vigre Assistant Professor in the Department of Mathematics, at the University of California, Los Angeles. For more see the MAD web site.

Dr. Emma Fenceroy passed on Tuesday, December 2, 2003, in Tallahassee after a long battle with cancer. She was a devoted and passionate professor of mathematics at Florida A&M University since 1972. She earned a B.S., Mathematics, Fort Valley State College; a M.S., Mathematics, Atlanta University and a Ph.D. University of Alabama-Tuscaloosa 1979. Her thesis under the direction of Alan Hopenwasser, was *Functional Representations of Reflexive Operator Algebras*.

MSRI will host CAARMS 10 June 22-25. The first CAARMS was held at the Mathematical Sciences Research Institute in 1995. It marked a significant opportunity for minority mathematicians and potential mathematicians. In additional lectures by professional mathematicians, significant component of CAARMS has been graduate student poster sessions. Many students have received support for travel, and many of these students have later received a Ph.D. in Mathematics.

The 3x+1 problem Has Been Solved

by Scott W. Williams

Consider the following function from the positive integers to itself. $f(x) = x/2$ if x is even, and $3x+1$ if x is odd. The 3x+1 problem conjectures that for each integer x some iteration f applied to x yields 1. Recently, Charles C. Cadogan has claimed the first positive solution to this problem. This elementarily stated problem is due to L. Collatz in 1937, and is therefore also known as the Collatz Conjecture. It has enthused both serious mathematicians as well as amateurs. Byran Thwaites of the UK has offered a £1000 prize for the solution to this problem also known as Hasse's algorithm, Kakutani's problem, Syracuse algorithm, Syracuse problem, Thwaites conjecture, and Ulam's problem.
At the time if this writing, Cadogan's paper [3]A Solution to the 3x+1 Problem is being considered for publication by the New Zealand Journal of Mathematics, and I suspect the author will not release preprints until it is accepted in a reputable journal. However, on February 12, 2004, Dr. Cadogan sent a copy to me. A colleague and I checked the proof and we believe it is true.

About the paper and references
Charles Cadogan has thought about this problem for quite some time. His first paper on the subject was 20 years ago in
[1]A note on the 3x+1 problem. Caribbean Journal of Mathematics 3 (1984), no. 2, 67--72.
He subsequently improved upon the original work in a number of papers, including
[2]Trajectories in the 3x+1 Problem. Journal of Combinatorial Mathematics and Combinatorial Computing 44 (2003)), 177-187.
Though the version of [3] I have seen includes ideas from the previous works, this new paper is self contained with numerous examples. This is useful as many libraries do not subscribe to the earlier journals.

Outline of proof.
1. First let's change the function slightly: If x is an odd integer let F(x) = q if 3x+1 = pq, where p is the largest power of 2 dividing 3x+1. Thus, three iterations of F on the 3, are F(3)=5, F(5)=1, and F(1)=1. 1 is a fixed point of F.
2. For integers x and y write x~y provided some iteration of f applied to x equals some iteration of f applied to y. Since the F sequence of 11 is <11, 17,13,5,1>, 31~11. The least number of iterations it takes to realize 11~31 also becomes important..
To obtain a positive solution to the 3x+1 problem, it is sufficient to establish
*For each x, there is y<x such that x~y.
3. Write each positive integer in binary notation. For each positive integer i, let L(i) be the set of integers numbers such that i is the largest number of consecutive 1s starting from the right in its binary representation. The L(i) partition the set of integers, give it its usual order in the integers, and let its j'th element be denoted by L(i,j).
Lemma A. If n>1, F(L(i)) is contained in L(i-1).
Thus, for each x, there is y in L(1) such that x~y.
4. Lemma B. For each L(1,n)= 4n+1 in L(1), non-negative n, 4n+1~3n+1 and if in addition, n is odd, then 4n+1~n.
5. Lemma C. For each L(1,j) there is k<j and m such that L(1,j)~L(k,m).
The last two lemmae suggests a tertiary view.
6. For each m let R(m) bet the set of the set of integers R(m,n) whose tertiary representation has at least m consecutive 1's from the right.
Lemma D. R(i,j)~L(i,j)
7. Lemma E. i+j is odd, then R(i,j) ~ R(i,j+1).
Lemma F. If x is odd, then x~2x+1.
8. Using Lemma C, the following solves the problem
Theorem. For any integer j, L(i,j)~L(1,j).

Dr. Charles C. Cadogan is a Professor of Mathematics at Department of Mathematics and Computer Science, University of the West Indies, Cave Hill, Barbados.

A Mathematician for the People

About NAM's 2004 Claytor-Woodard Lecturer Jonathan David Farley

by Scott Williams

Recently I attended a committee meeting of an international mathematics organization where one of my colleagues said, "Have you see Farley's web page?" By this he was asking whether I had seen Jonathan Farley's old Vanderbilt University web page with the giant Che Guevera poster (also favored by my daughter) on the wall behind his office desk. Now this comment struck me oddly because of what he was not asking. He was not asking whether I had heard of the latest old math problem Farley had solved; not asking about Farley's 2002 candidacy for Congress in Tennessee; not asking about Farley's move to MIT; not asking about Farley's battle with racists in Tennessee; not asking about Farley's appearance in EBONY as "A Leader of the Future." Well who is this Farley?

In 1970 Jonathan David Farley was born in Rochester New York. He comes from an accomplished family. His father, a native of Guyana, holds a Ph.D. from the London School of Economics; his mother, who is Jamaican, has a Ph.D. in American history and is a Regent for the State of New York. Farley's three brothers are all Harvard graduates. (His brother Christopher John Farley is a senior editor and pop music critic for Time Magazine.)

photo by J. Giles

In 1991 Farley graduated second in his class and Suma cum laude with a Bachelor's degree in Mathematics from Havard University. His grades consisted of 29 A's and 3 A-'s. He won a Marshall Scholarship to do graduate work at Oxford University. In 1994 he was awarded Oxford University's Senior Mathematical Prize and Johnson Prize for his research. While in England, he won Oxford's highest mathematics awards, the Senior Mathematical Prize and Johnson Prize for "the dissertation of the greatest merit" by a mathematics graduate student under the age of 25.. He received his doctorate (D.Phil. - Mathematics) from Oxford University (England) in July, 1995.

From 1995 to 1997, Farley was a Post-Doctoral Fellow at the Mathematical Sciences Research Institute (MSRI) in Berkeley, California. Since MSRI, Dr. Jonathan Farley has been an Assistant Professor of Mathematics at Vanderbilt University in Nashville, Tennessee. He is one of only four people in the United States to receive a 2001-2002 Fulbright Distinguished Scholar Award to the United Kingdom (back to Oxford). Currently is completing a two year Visiting Professorship of Applied Mathematics at the Massachusetts Institute of Technology. He is an Associate Professor of Mathematics at Vanderbilt University.

Dr. Farley's main areas of research are lattice theory and the theory of ordered sets. In spite of his recent Ph.D., he has published 15 very good papers. He has solved some very important problems, one open 25 years, the other 35 years. For a list of his papers see **http://www.math.buffalo.edu/mad/PEEPS/farley_jonathan.html**

A life member of the NAACP, Farley speaks locally and nationally on topics like "How to Get Straight A's in College." Though Vanderbilt is generally known for its conservatism, Farley has brought in left-wing speakers like Kathleen Cleaver, a former leader of the Black Panther Party, and white anti-Nazi activist Tim Wise. Farley's heroes include the African military genius Hannibal, the West Indian psychiatrist Frantz Fanon, the Cuban revolutionary Che Guevara, and Jesus.

In addition to his mathematics, Jon Farley has written for the hip-hop magazine The Source, Essence, The Guardian (a major British newspaper), and Time Magazine On-Line. In November, Farley was one of the invited speakers at the Stop the War rally in London that drew 100,000 people.

A SIMPLE INTRODUCTION TO GNUPLOT
by Jean Cadet

GNUPLOT - version 3.7.3 DESCRIPTION and HISTORY

Gnuplot is a free, command-driven, interactive, function and data plotting program. It can be used to plot functions and data points in both two-and three- dimensional plots in many different formats, and will accommodate many of the needs of today's scientists for graphic data representation.

Gnuplot is copyrighted, but freely distributable; Gnuplot is freeware in the sense that you don't have to pay for it. However it is not freeware in the sense that you would be allowed to distribute a modified version of your gnuplot freely. The details are explained in the copyright file in the distribution.

Gnuplot is neither written nor maintained by the Free Software Foundation (FSF.) It is not covered by the General Public License, either. It used to be distributed by the FSF, however, due to licensing issues it is no longer.

Gnuplot Offers: Plotting of two-dimensional functions and data points in many different styles (points, lines, error bars); computations in integer, float and complex arithmetic; plotting of three-dimensional data points and surfaces in many different styles (contour plot, mesh); support for complex arithmetic; self - defined functions; support for a large number of operating systems, graphics file formats and devices; extensive on-line help; labels for title, axes, data points; command line editing and history on most platforms.

Before downloading gnuplot, it's important to read the readme file in order to select the appropriate version for your platform. The most common ones are: Windows, MacIntosh, Unix and Linux. An alternative is to browse Henri Gavin's Gnuplot Brief Manual and Tutorial at http://www.duke.edu/~hpgavin/gnuplot.html

Gnuplot can be run under DOS, Windows, Macintosh OS, BeOS, OS2, VMS, Linux, and many others. At this website, you can download with the click of your mouse the appropriate version for your operating system.

USING GNUPLOT

On Unix/Linux systems start Gnuplot by simply typing: gnuplot . In Windows, you will execute gnuplot by clicking on the gnuplot icon at your desktop. At the "gnuplot> " prompt you can use many commands.
Here is an example of plotting y = sin(x)
gnuplot> plot sin(x)
Since the range of X and Y axes are not specified, gnuplot determines appropriate values for that automatically. The example above you can see the default X range which is -10 to +10, and the Y range was automatically determined.
To change the X range from 0 to 5, include [0:5] in the command line like this:
gnuplot> plot [0:5] sin(x)

Or we could accomplish the same task by doing this instead:
gnuplot> plot sin(x)
gnuplot> set xrange [0:5]
gnuplot> replot

To specify a larger X range from -20 to 20, do
gnuplot> set xrange [-20:20]
gnuplot> replot

If you want to see the latter graph in a larger setting for the y-range, do
gnuplot> set yrange [-2:2]
gnuplot> replot

A graph is not complete without labels. You can specify the labels for each axis by inserting some text into the xlabel and ylabel as follows:
gnuplot> set xlabel "X-AXIS"
gnuplot> set ylabel "Y-AXIS"
gnuplot> replot

Or we could change these labels with
gnuplot> set xlabel " Time (seconds)"
gnuplot> set ylabel " Height (inches)"
gnuplot> replot

Plotting polynomial has a little twist to it since we're accustomed to writing powers with the ^ sign. Plotting the square of x will yield an errror message.
gnuplot> plot x^2 non-integer passed to boolean operator That is easily corrected with using ** instead of ^. gnuplot> plot x**2

Fix the settings for the y-range with
gnuplot> set yrange[0:400]
gnuplot> replot

To include grids, do
gnuplot> set grid
gnuplot> replot

To turn off these grids, do
gnuplot> set nogrid
gnuplot> replot

Finally, all the work can be save to a postscript file. Whenever a terminal is not specified, gnuplot makes a graph on your screen. To change the destination of your plot into a postscript file or printer, use the command 'set terminal'. For a different type of file, gnuplot can produce that file in that format by means of various drivers.
First, let's finish this postscript example. The file with we're saving is hello.ps and we want to save the graph of y = x^2 + sin x. We'd do the following steps. Note: whatever comes after ** is the computer response to the prior line command.gnuplot> set terminal postscript
**Terminal type set to 'postscript'
**Options are 'landscape noenhanced monochrome dashed defaultplex "Helvetica" 14'
gnuplot> set output "hello.ps"
gnuplot> plot x**2+sin(x)

At this point, no graph of y = x^2 + sin x will appear on the screen because it has piped into the file hello.ps. Search in your directory for it. To return to having it printed on the screen, we need to reset the terminal as follows:
gnuplot> set terminal x11
Terminal type set to 'x11'

Options are '0'
gnuplot> set output
gnuplot> replot
Now, the graph of x**2 +sin x will appear on the screen.

To have it in a .fig format, we need to reset the terminal to fig and repeat a similar scheme.
gnuplot> set terminal fig
gnuplot> set output "hello.fig"
gnuplot> replot
And to reset to the original x11 seetings, do:
gnuplot> set terminal x11
Terminal type set to 'x11'
Options are '0'
gnuplot> set output

More complex operations can be done such as plotting two or
three functions on one graph, plotting in 3D, using file scripts to produce your graphs, etc. For more, check the websites below.

Websites with Gnuplot tutorials

1. Gnuplot Central, the new, official web site for gnuplot: http://www.gnuplot.info
2. Introduction to gnuplot (Basic Use) with pictures: http://t16web.lanl.gov/Kawano/gnuplot/intro/basic-e.html
3. Introduction to GnuPlot (with pictures): http://www.cs.uni.edu/Help/gnuplot/
4. GNUPLOT - A Brief Manual and Tutorial http://www.duke.edu/~hpgavin/gnuplot.html
5. Plotting Data with gnuplot http://www.cs.hmc.edu/~vrable/gnuplot/using-gnuplot.html

Photos from Phoenix

NAM at the 2004 Joint Mathematics Meetings in Phoenix
Photos by J. Giles
New PhDs:

At the NAM Banquet

Wth J. Giles with P. Kenschaft

Project NExT: New Experiences in Teaching

Project NExT (New Experiences in Teaching) is a professional development program for new and recent Ph.D.s in the mathematical sciences (including pure and applied mathematics, statistics, operations research, and mathematics education). It addresses all aspects of an academic career: improving the teaching and learning of mathematics, engaging in research and scholarship, and participating in professional activities. It also provides the participants with a network of peers and mentors as they assume these responsibilities. Each year, about sixty faculty members from colleges and universities throughout the country are selected to participate in a workshop preceding the MAA summer meeting, activities during the summer MAA meetings and the Joint Mathematics Meetings in January, and an electronic discussion network. Faculty for whom the 2004-2005 academic year will be the first or second year of full-time teaching (post Ph.D.) at the college/university level are invited to apply to become Project NexT Fellows.
The application deadline is April 16, 2004. For more information, see the Project NExT Web site, http://archives.math.utk.edu/projnext/.
Project NExT is a program of the Mathematical Association of America. It receives major funding from The ExxonMobil Foundation, with additional funding from The Dolciani-Halloran Foundation, The American Mathematical Society, The Educational Advancement Foundation, The American Statistical Association, The National Council of Teachers of Mathematics, The Association of Mathematics Teacher Educators, The Association for Symbolic Logic, and the Greater MAA Fund.

The Cornell Topology Festival

May 7-10, 2004 --- Ithaca, NY
http://www.math.cornell.edu/~festival/

This year's Festival features a mini concentration in 3-Manifolds, although many other fields in topology will also be represented.

The Speakers: Ian Agol (UIC); Jeff Brock (Texas, Austin); Nathan Dunfield (Caltech); John Etnyre (Pennsylvania); Peter Kronheimer (Harvard); Yuli Rudyak (Florida); Rostislav Grigorchuk (Texas A&M); Richard Schwartz (Maryland); Dennis Sullivan (CUNY/SUNY Stony Brook); Zoltan Szabo (Princeton); William P. Thurston (Cornell).

Financial support will be available: Young researchers (including graduate students) as well as members of underrepresented groups are especially encouraged to apply. If interested, please fill out the form on the webpage given above.

Support AMUCHMA

For 29 issues, the African Mathematical Union's Commission on the History of Mathematics in Africa (AMUCHMA) has revealed new and interesting mathematical material to the world of history, archeology, and education. The reproduction and distribution of the first 24 issues of the AMUCHMA Newsletter counted with the generous support from the Research Department of the Swedish International Development Agency (SIDA-SAREC). The contract with SIDA-SAREC came to an end and there is a call for support financially AMUCHMA's activities and/or to suggest alternative sources of financing. The newsletter s free and accessible on the website:
http://www.math.buffalo.edu/mad/AMU/amuchma_online.html

NAM Vice President Nate Dean's Actvities

In addition to the position of Vice President of NAM, Dr. Nathaniel Dean, Chair of Texas Southern University Mathematics Department, is also Chair of the AMS Nominating Committee, Program Director for the SIAM Activity Group on Discrete Mathematics, Associate Editor of the Notices of the AMS, Co-organizer of the Special Session on Graph Theory and Combinatorics at the Joint AMS-SMM International Meeting inHouston, TX, May 13-15, 2004.

NAM Calendar

You can find NAM's Online Conference Calendar and the most recent links to relevant conferences announcements. at http://www.caam.rice.edu/~nated/orgs/nam/programs/conferences.html

*March 12-13, 2004 NAM Regional Faculty Conference, Texas Southern University, Houston Texas
*June 22-25, 2004 CAARMS 10, MSRI Berkeley California.

NAM Job Openings Web Site

Recall that for several years, NAM has had a web site with listings of open positions. This process is open to advertisers in the Newsletter. The advertisements appear there six or more weeks before they appear in the Newsletter, since November 15, 2002. Go to the editor's NAM web site within MAD: **http://www.math.buffalo.edu/mad/NAM/**

NAM Board, Elections and Terms

NOMINATIONS (open to members) are due for the NAM Board positions Vice-President, Region B representative, and Majority Institution representative. By August 1, 2003, please contact NAM's election supervisor Dr. Earl Barnes School of Industrial Systems Engineering; Georgia Institute of Technology; Atlanta, GA 30332-0205. Make certain the nominated individual agrees to run. Send vita data such as Name, email address, School, position, and date of last degree.

All members of the Board shall be elected to a term of office for a period of two years and elections shall be staggered for continuity. Regular elections shall occur in the fall of each year and the persons elected shall be duly installed at the first Annual NAM meeting following the election. The term of each elected position is three (3) years. The editor will be an appointed position for a period of three years. The Editor shall be responsible for the production of the Newsletter and shall perform such other duties as the Board of Directors may specify. The Executive Secretary shall be selected to serve for a period of five (5) years and shall begin the term of office at the Spring Board Meeting. His/her selection must be the unanimous choice of the existing Board of Directors.

The election of the members of the Board of Directors shall be by official ballots and shall be supervised by the Board of Director's Committee on Legislation-Nomination when the election is by mail, all current members in good standing in NAM shall be provided a ballot and given reasonable time to return it.

The election cycle is can be followed modulo 3. Year 2001 was year 2 mod 3. It is the election Representative of Region C, Community College Representative, Secretary/Treasurer.
In year 0 mod 3 Representative of Region A, Government/Industry Representative, President

In year 1 mod 3 Representative of Region B, Majority Institution Representative, Vice President.
A call for nominations will be made in the Spring Issue of the Newsletter. Nominations should be made to the Editor by August 15 of the election year.

NATIONAL ASSOCIATION OF MATHEMATICS MEMBERSHIP FORM

(FOR NEW APPLICATIONS AND ANNUAL MEMBERSHIP RENEWAL)

******* MEMBERSHIP CALENDAR YEAR: JANUARY 1 –DECEMBER 31 *******

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ADDRESS ____

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SELECT APPROPRIATE MEMBERSHIP TYPE

[ ] STUDENT : $15

[ ] INDIVIDUAL : $25   [ ] CONTRIBUTING : $50   [ ] SUSTAINING : $75

[ ] INSTITUTIONAL : $100   [ ] LIFE : $400

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E-mail: rbozeman@morehouse.edu
Web page: (new) http://www.math.buffalo.edu/mad/NAM/index.html

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INDIVIDUALS AND STUDENTS : Please complete below if you did not send NAM this information within the past three years.

List all degrees you currently hold. Circle the correct degree.
B.S. or B.A. : Area __________________ ___   Institution __________________ ________
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_____________ Committee Member (specify interest) : Interest _____________

_____________ Need additional information about the organizational structure of NAM

Ethnicity : African American [ ] Hispanic American [ ] White [ ] Other [ ]

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