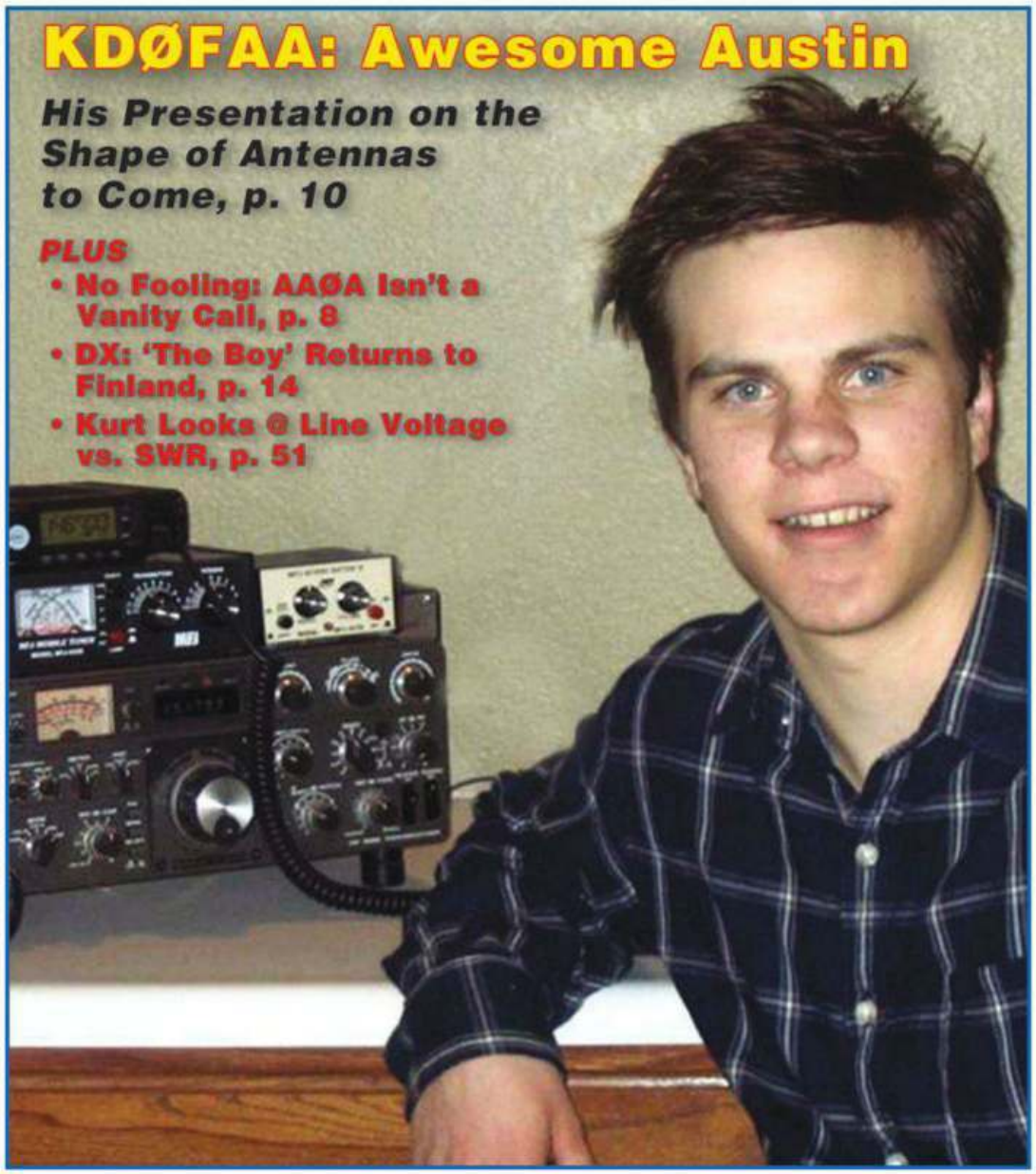
WorldRadio ONLINE

Year 41, Issue 10 APRIL 2012 $2.99



NEWS • FCC • DX • SATELLITES • CONTESTS • HAMFESTS • AERIALS • CW

KDØFAA: Awesome Austin Leaves 'em Spellbound In Dallas

By Carole Perry WB2MGP

"I don't believe it!" Radio Club of America President, Vivian Carr, exclaimed.

"I've been in the antenna business for 30 years, and I've never heard anything like this!" said Jim Stratt of JCS Associates, Ontario, Canada.

"I'm speechless!" said Elaine Walsh, RCA Vice President and President of Communications Marketing Association (CMA).

Austin Schaller, KDØFAA, age 17, of Boulder, Colorado was the first young adult invited to be a presenter at the annual Radio Club of America (RCA) Technical Symposium in Dallas. Carr, Stratt and Walsh — impressive people in their own right — *were blown away.* Along with everyone else.

As chair of the RCA Youth Activities committee, I'm always looking for new initiatives to showcase the talented young people, under age 18, who have demonstrated technical excellence and creativity in wireless communications. With the support of the Board of Directors, I invited Austin to speak at the Technical Symposium in November 2011, **Photo A**. It was held in conjunction with the RCA Awards Banquet.

This remarkably talented, modest young man is so accomplished at such a young age, we just had to profile KDØFAA, this month. Perhaps he will inspire other young, enthusiastic ham radio operators, and their teachers, *Elmers* and *Elmiras,* who make us all so proud and optimistic about the future of our hobby and service.

In the Beginning . . .

Frank de Vall, WØBIW, Austin's grandfather, sparked an interest in electronics and amateur radio in his young grandson by engaging him in projects 'BIW was working on. They spent time together, learning, discovering and having fun.

In 2009, Austin joined the Boulder Amateur Radio Club for Juniors — BARC Juniors <http://bit.ly/zl99z1>.

Photo A. Austin Schaller, KDØFAA, poses with *WRO Hams With Class* columnist Carole Perry, WB2MGP, during the 2011 RCA Technical Symposium in Dallas. *(Courtesy of WB2MGP)*

Since that time he has been actively participating in its weekly educational activities. As a side note, the leaders of BARC Juniors — "Rip," NVØM; and Ellie, NØQCX, Van Winkle, have sent many youngsters in the past 21 years to participate as presenters in my Dayton Hamvention® Youth Forum: <http://bit.ly/wAie0F>.

With the support of BARC Juniors, Austin passed his Technician, General and Extra Class licenses in eight months. Shortly thereafter, he became an *Elmer* and taught other kids the basics of electronics theory in preparation for their obtaining their ham radio licenses.

During the same year, Austin was invited to speak at the Dayton Youth Forum, **Photo B**, on his chosen topic of "Fractal Antennas." When I invited him back in 2011 his presentation was about PIC Microcontrollers and their potential for ham radio applications.

A Valuable Internship and School

In June 2010, Austin obtained an internship at FreeWave Technologies and learned several programming languages that contributed to the design and development of FreeWave's company products and engineering systems. His programs were used to test the performance of products that the engineers were experimenting with, such as sensitivity, RF susceptibility, and power output. *(**VISIT**: FreeWave Technologies' website: <http://www.freewave.com/>. – Ed.)*

Austin is a junior at Colorado Virtual Academy℠ in Boulder, <http://bit.ly/A2UuKT> and keeps busy with homebrew projects, recently building a powerful desktop computer and collaborating with BARC Juniors to build an Edge of Space Sciences telemetry beacon.

To relax, Austin likes to play classical guitar, which he has studied for more than nine years.

KDØFAA's Remarkable RCA Presentation

For the RCA Technical Symposium, I asked Austin to write a *layman's summary* of his research and work with fractal antennas. In KDØFAA's own words:

Until the 20th century, many of the rough and fragmented shapes in nature were thought to have been random occurrences. It was difficult to imagine that the trees, clouds, mountains and other formations that we see every day could be represented by mathematical equations.

A French mathematician, Benoit Mandelbrot, <http://bit.ly/waBcM9>, **Photo C**, indicated that it was possible. During the 1960s, Mandelbrot coined the term "fractal" and discovered a new branch of mathematics that could represent many of the complex formations present in nature. *(**IN DEPTH**: See the TV-*

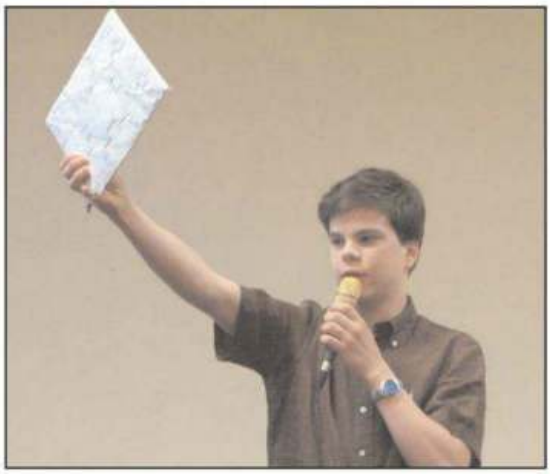


Photo B. In 2009, an even more youthful Austin Schaller spoke about Fractal Antennas at the Dayton Hamvention® Youth Forum. *(Courtesy of WB2MGP)*

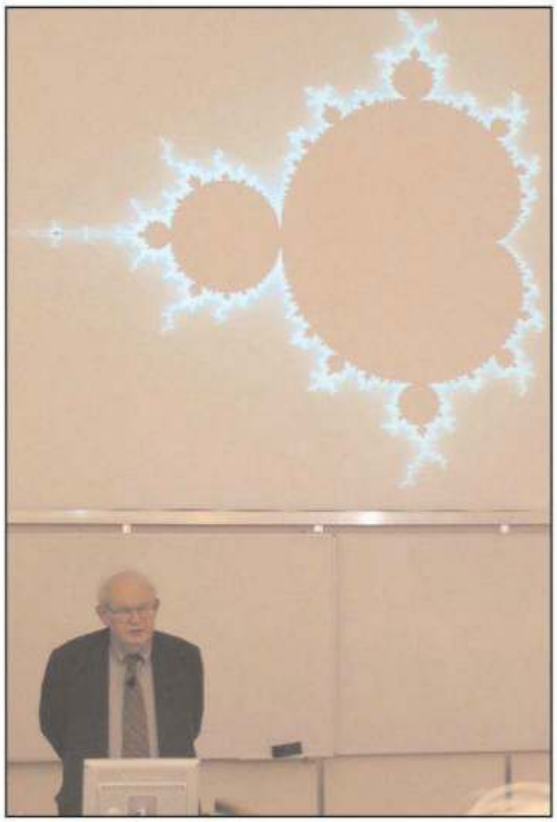


Photo C. French mathematician Benoit Mandelbrot gives a dissertation on fractals during a lecture titled "The Rough and Smooth" in Warsaw, Poland in 2005. *(Courtesy of Olaf, via Wikimedia Commons)*

science series NOVA website "A Radical Mind" on PBS with more information about Benoit Mandelbrot, <http://to.pbs.org/A8cCJr>. – Ed.)

When Nathan "Chip" Cohen, W1YW, a Boston radio astronomer, invented the idea of a fractal antenna in 1988, antenna design had reached an entirely new level of sophistication.

(Nathan Cohen has very graciously invited Austin and me to visit with him at his facility in Boston this spring. Needless to say, Austin, granddad Frank, and I, are really excited about this future adventure with a true antenna pioneer. – WB2MGP)

The basic theory of fractal geometry begins with the abstract idea of self-similarity. As shown in **Figure 1**, a fractal is generated through a number of discrete steps, consisting of an initiator, generator and a series of iteration levels. The smaller triangles branch out from the larger triangles, emphasizing the concept of self-similarity.

The unique structure of a fractal antenna allows it to maximize its perimeter length and significantly reduce its overall size. Fractal antennas are also multi-band and wideband. They operate on multiple bands simultaneously, and exhibit an effect called "fractal loading," which can compact the overall size of the antenna, further. They also lend themselves to be easily integrated onto printed circuit boards." *(**SEE**: For a simulation in 4NEC2, refer to **Figure 2**. – Ed.)*

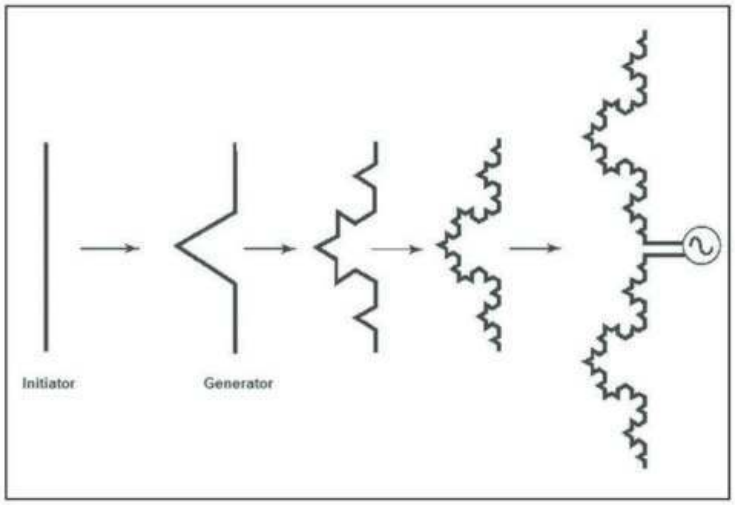


Figure 1. Here is an example of how to generate a fractal with the Koch Curve, <http://bit.ly/y0vsGP>. *(Courtesy of KDØFAA)*

A Spellbound Audience

For 45 minutes, Austin had the audience totally enthralled with his presentation. Ted Rappaport, Fellows Committee Chair, and Bob Hobday, N2EVG, Deputy Director of the Antique Wireless Association Museum were among the first to embrace and congratulate Austin

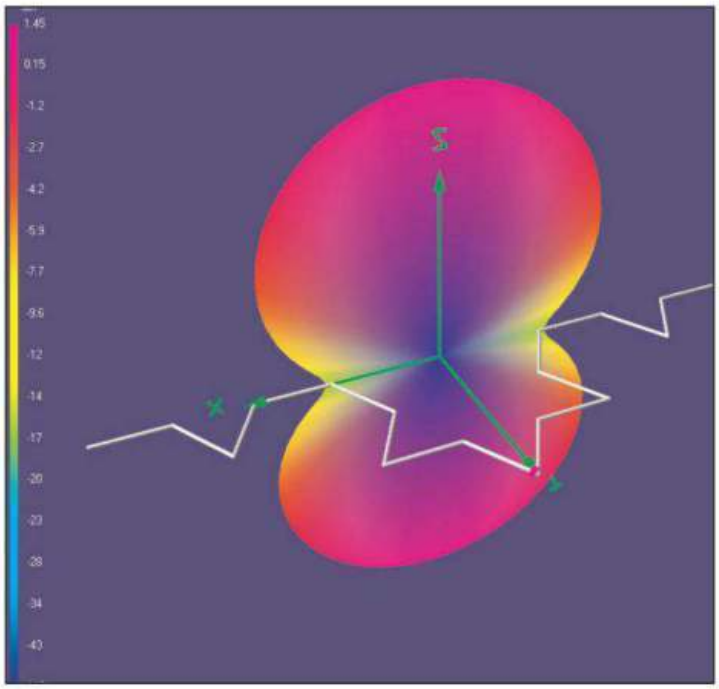


Figure 2. This is a simulation in 4NEC2 <http://bit.ly/wqJU2E> of the two-dimensional field strength pattern for the second-iteration Koch Curve fractal antenna. *(Courtesy of KDØFAA)*

Photo D. KDØFAA takes questions from participants of the RCA Technical Symposium in Dallas in November 2011, <http://bit.ly/xvis1f>. *(YouTube screen grab)*

— and to offer assistance for anything in the future he might need.

My goals in inviting him to speak were twofold:

- To give Austin the opportunity of interacting and networking with the talented and successful RCA members he would encounter that weekend.
- To have RCA members open the door for young people, under 18, to participate in our organization and to enrich us in so many ways. It's a win/win for everyone.

*(**WATCH:** Austin Schaller, KDØFAA's, RCA Technical Symposium presentation in three parts: Part I, <http://bit.ly/AFx2N9>; Part II, <http://bit.ly/wV2CvV>; Part III, <http://bit.ly/xvis1f>. – Ed.)*

I'd like to acknowledge and thank Rich Reichler, Sections/Industry Conferences Committee Chair; and Andy Seybold, RCA Director and Moderator of the Symposium, for their help and encouragement to Austin during his preparation for the event. They were welcoming and supportive to this wonderful young man, whom I know we all will be hearing more about in the future.