

# **MOUNTAIN SPARK GAPS**

**NPARC—The Radio Club for the  
Watchung Mountain Area**



**Website: <http://www.nparc.org>  
Club Calls: N2XJ, W2FMI  
Facebook: New Providence Amateur Radio Club  
(NPARC)**

**VOLUME 54 NO. 6 June 2019**

**Regular Meetings  
7/8 & 7/22 Monday 7:30  
DeCorso Community Center**

**Upcoming Events**

**Enjoy the rest of the summer.**

## Meeting Schedule

**Regular Meeting:** 7:30—9:00 PM  
**2nd & 4th Monday  
of each month** at the  
NP Senior & Adult Center  
15 East Forth Street  
New Providence

**Everyone is Welcome**  
If a normal meeting night is a holiday,  
we usually meet the following night.  
Call one of the contacts below  
or check the web site

## Club Officers for 2018

President: W2PTP Paul Wolfmeyer  
201-406-6914  
Vice President: K2GLS Bob Willis  
973-543-2454  
Secretary: K2AL: Al Hanzl  
908-872-5021  
Treasurer: K2YG Dave Barr  
908-277-4283  
Activities: KA2MPG Brian Lynch  
973-738-7322

## —On the Air Activities

Club Operating Frequency  
145.750 MHz FM Simplex

Sunday Night Phone Net  
Murray Hill Repeater (W2LI) at 9:00 PM  
Transmit on 147.855 MHz  
With PL tone of 141.3 Hz  
Receive on 147.255 MHz  
Net Control K2AL

Digital Net  
First & Third Mondays 9 PM  
28,084 — 28,086  
Will be using PSK and RTTY  
Net control K2YG

## Club Internet Address

Website: <http://www.nparc.org>  
Webmaster KC2WUF David Bean  
Reflector: [nparc@mailman.qth.net](mailto:nparc@mailman.qth.net)  
Contact K2UI, Jim

## MOUNTAIN SPARK GAPS

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Editor: K2EZR Frank McAneny  
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WB2OOQ Rick Anderson  
W2PTP Paul Wolfmeyer  
K2UI Jim Stekas

## Climatological Data for New Providence for May 2019

The following information is provided by  
Rick, WB2OOQ, who has been recording daily  
weather events at his station for the past  
38 years.

### TEMPERATURE -

Maximum temperature this May, 86 deg. F (May  
19,20,26)  
Last May(2018) maximum was 93 deg. F.  
Average Maximum temperature this May, 71.3  
deg. F  
Minimum temperature this May, 44 deg. F (May  
12,13,15)  
Last May(2018) minimum was 41 deg. F.  
Average Minimum temperature this May, 55.3  
deg. F  
Minimum diurnal temperature range, 5 deg.  
(49-44 deg.) 5/13  
Maximum diurnal temperature range, 27 deg.  
(86-59 deg.) 5/19

Average temperature this May, 63.3 deg. F  
Average temperature last May, 67.2 deg. F

### PRECIPITATION -

Total precipitation this May - 9.46" rain  
Total precipitation last May - 4.60" rain

Maximum one day precip. event this May -

May 5, 2.0" rain  
Measurable rain fell on 21 days this May, 14  
days last May.

YTD Precipitation - 26.18"  
Season to Date Snowfall - 23.3" (11/15/18-  
3/31/19)

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Rick Anderson  
6/23/19

243 Mountain Ave.  
New Providence, NJ  
(908) 464-8912  
[rick243@comcast.net](mailto:rick243@comcast.net)

**Lat = 40 degrees, 41.7 minutes North**  
**Long = 74 degrees, 23.4 minutes West**  
Elevation: 380 ft.  
CoCoRaHS Network Station #NJ-UN-10

## President's Column June 2019

First, welcome to new member Doug Slater KD2QXX...glad to have you on board as a member and at Field Day...

Second, dates for your calendar:

September 9—first fall meeting—Ria N2RJ will be with us to do her SDR presentation.

December 7—first Saturday in December—our holiday party!!

**And now a recap of Field Day 2019:** Thanks to all participants for a great Field Day weekend!! Lots of Qs: about 315 CW, 190 digital, and 425 phone. Overnighters James KB2FCV and Phil N2JU contributed heavily to the cw and digital increases over last year—great work!! On phone we could have used more operators....

As usual, you all stepped up and did what you said you would—that's a hallmark of NPARC that makes our FD work!

We set out with several goals in mind:

1. Two HF stations-- "Near HF station" delivered many phone contacts and lots of overnight CW contacts. Kevin (N2TO) managed it well.
2. A digital HF station: Bob's (K2GLS) "Far HF Station" worked well. Bob's preplanning and testing paid off well with Sam's IC7100. Again, digital contacts went from 50 last year to 190!!
3. Have a GOTA station to enable our new members to get-on-the air: Thanks to Don N2SLS and Ken W2IOC.
4. Continued success with VHF: completed thanks to Al (K2AL) and Rick (WB2QOQ)-- that tower set up is always impressive!
5. Involve more operators and fill more time slots—we could have used more operators and loggers. Ed W2EWQ got his "logging certificate" in a heavy contact period on Saturday afternoon!.
6. Capture bonus points as much as possible--Al's solar-charged qrp Qs, generator operation, a mayoral visit, Berkeley Heights FD visit, attention to safety, getting the W1AW message, and submitting 10 tfc messages (thanks KA2HZP), etc...

And the food was good (thanks Sam), the grill worked great (thanks Jim KD2ITW), grill chef K2AL did super, the photo documentation got completed (thanks Jon AE2JP), the publicity was great (the Secretary K2AL winds up with so much to do) and the logging network ran well (thanks Dave (KC2WUF) and the "new" computers worked good....the food canopy provided good shade (K2YG), the tables were great (KD2EKN), the antenna support (K2EFB) worked well and went up/down well, antenna stings were "shot" (Frank K2EZR) ...and, from my perspective "young guys" were particularly appreciated for setup and teardown...

**And the weather was absolutely outstanding!!**

And we thank Dave KC2WUF as he collects material and compiles the log submission...

Thanks again to everyone. As usual in a big team operation, people get missed in the thanks—for that I apologize...everyone's help was appreciated ...

73 for now, Wolf W2PTP, 201-404-6914, [w2ptp@arrl.net](mailto:w2ptp@arrl.net)

## Radio's Secret Sauce

Jim Stekas - K2UI

In southern France there is a city called Sophia Antipolis created to be a center of technological research. It is the home of the European Telecommunication Standards Institute (ETSI) and the 3rd Generation Partnership Project (3GPP) which crank out the bulk of the world's international communication standards including 3G (UMTS), 4G (LTE) and 5G. Every year thousands of pages of new and updated standards are released.

The standards are adopted to assure the interoperability of equipment from different manufacturers, particularly mobile phones and base stations. They are specifications agreed to by a consortium of competing manufacturers and service providers. The radio signals that go out over the air are well defined but there is practically nothing in the standards about **how** to produce or receive those signals. For the system to work, manufacturers have to add their own “secret sauce”.

Most of digital voice and data in wireless systems use Forward Error Correction (FEC) coding to minimize bit errors. The standards specify the FEC codes to be used, and typically show simple diagrams of the encoding process on the transmit side. What they don't define is a decoder design on the receiver side. That is problem left to the receiver (cell phone) manufacturers to figure out.

FEC decoding accounts for a large, if not the largest, fraction of the computational load in a smart phone. The great advances on wireless data over the last 20 years did not occur because people figured out how to write better standards, but because manufacturers figured out how to implement better and more powerful demodulation and FEC decoders. Chief among the innovators is Qualcomm who produce the key chips and algorithms that make our smart phones so smart.

Convolutional coding was the standard FEC used by 2G cellular systems (GSM, CDMA, UMTS<sup>1</sup>). The Viterbi algorithm used for decoding convolutional codes was invented by Andrew Viterbi, one of the founders of Qualcomm, and published in a 1967 paper while he was a professor at UCLA. Viterbi received the IEEE Medal of Honor in 2010 for his engineering contributions and is now Presidential Chair Professor of Engineering at USC, his alma mater<sup>2</sup>. In ham radio convolutional codes, and Viterbi's algorithm, are used in digital modes JT4, JT9 and WSPR.

Low Density Parity Check (LDPC) codes provide even more powerful FEC and are used in FT8, 4G/LTE, and deep space communications. LDPC was invented in the 1960's but practical decoders were not developed until around 2000. Open source LDPC decoders are available but these are not what are used in your 4G smart phone. LDPC is a large consumer of CPU cycles, and hence power, so manufacturers devote significant research efforts to optimizing their own proprietary implementations which can distributed across multiple hardware computing resources: CPU, DSP, GPU, ASIC. (Actually, most smart phone manufacturers rely on Qualcomm chips and SW to do the heavy lifting while they concentrate on “look and feel”.)

5G will include adaptive multi-antenna capabilities like MIMO, beam steering, interferer cancellation to provide >100Mbps data rates. The 5G standards will outline **what** to do but it will be left to the base station and smart phone manufactures to provide “secret sauce” to accomplish the **how**.

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1 The initial release of UMTS was a basically a clone of CDMA with very limited data capability.

2 Officially the “Viterbi School of Engineering”.