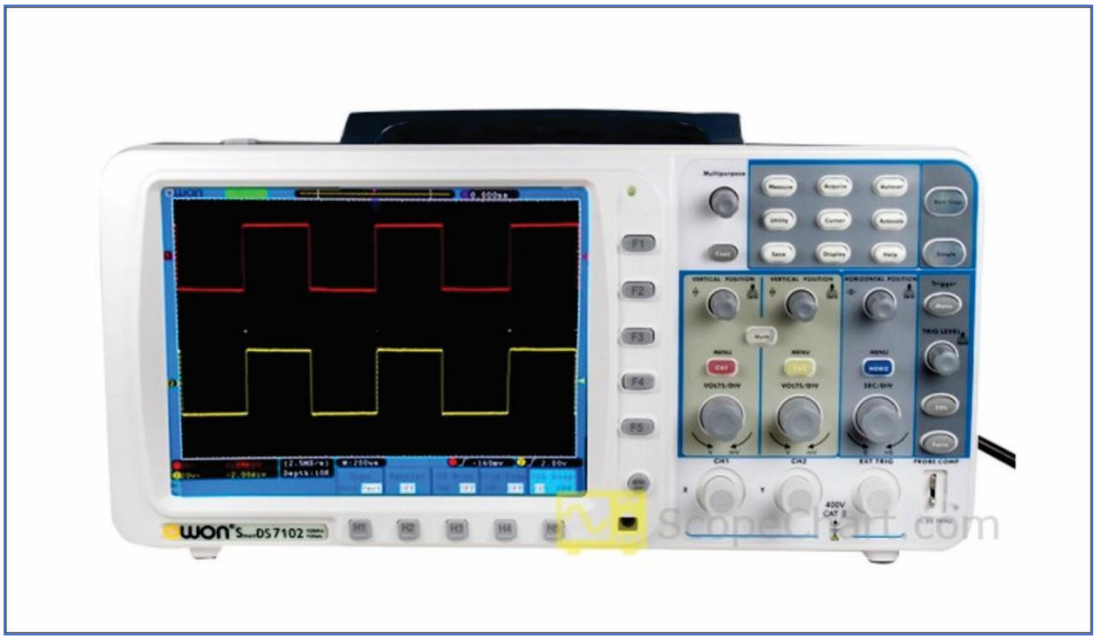
Workshop: Advanced EMF Instrumentation Techniques 2020

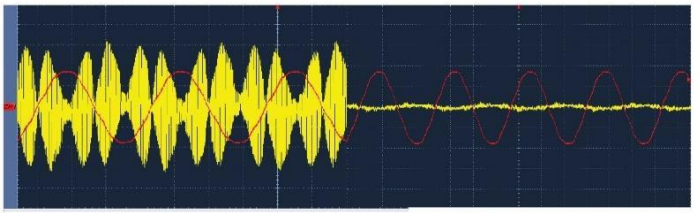


21 through 25 July 2020

Included in your workshop tuition, each student will receive an OWON SDS7102V 2 Channel 100 MHz Bandwidth Oscilloscope with battery and case, a Stetzer Ubiquitous filter (High Pass Filter) for detecting MEP/DE signals and an Extech Model 382252 Earth Resistance Tester for checking for Stray Voltage and Earth System Ground resistance with all the training to operate and create reports from the measurements made with these devices. You take this equipment back home with you with all the skills to run them.

Your tuition also includes meals and, should you opt to reside on the White Lodge premises, your lodging costs; you are also welcome to bring and prepare your own meals (please see page 9 for details). Class size is strictly limited to eighteen (18) students.

The daily schedule includes lectures, instrument demonstrations, group labs with recommended instrumentation, interactive discussions of lab results and, finally, a full assessment of retreat premises. Enrollment is open only to students who have successfully completed Building Biology Institute's electromagnetic radiation seminar (IBE 212); exceptions can be made for candidates with professional real-world experience by applying directly to the seminar organizers.



All material is authored and presented by William S. Bathgate and his team (please see page 6 for bios), except where third-party sources are cited expressly.

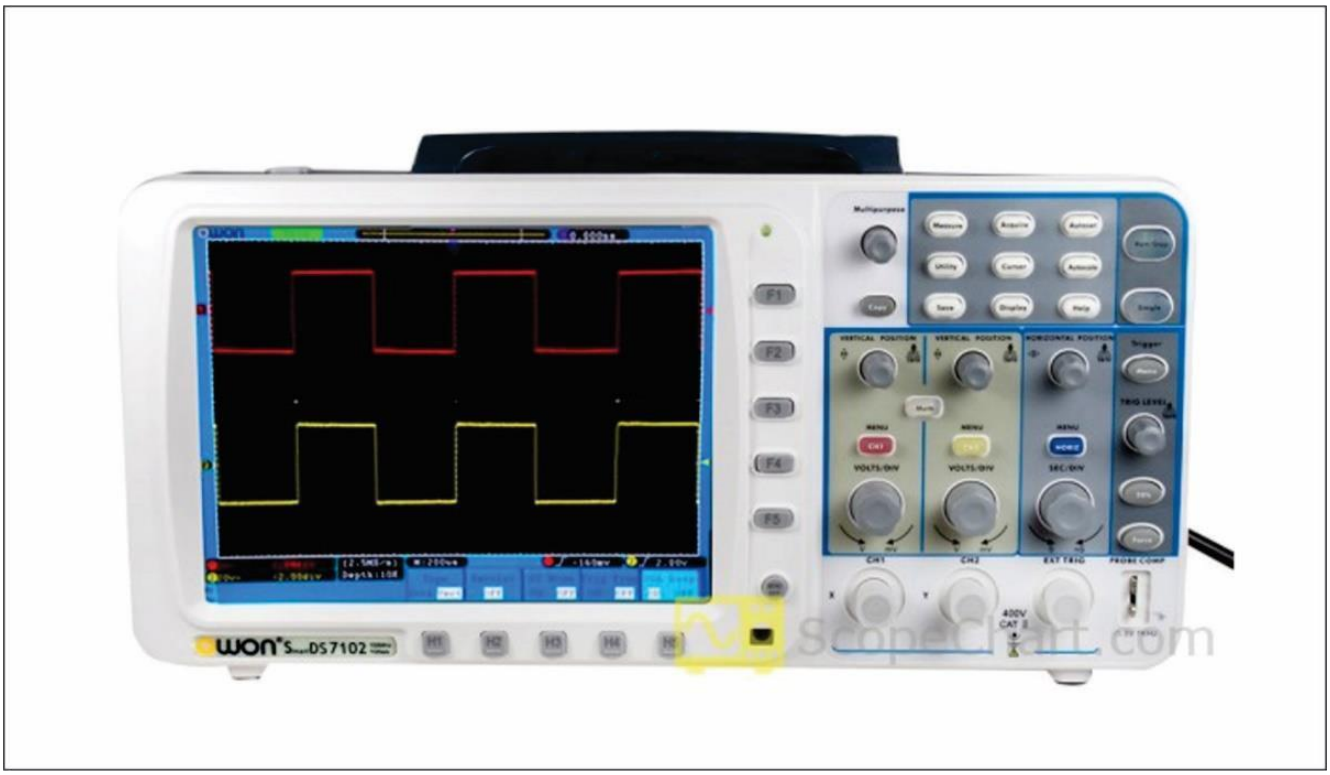
Contents

Prerequisites

The software required to download and analyze OWON data runs on Windows 10 laptops only (Apple PC products will not run the OWON software). *Students are therefore required to come to class with a Windows 10 laptop - no exceptions.* If you do not have one, basic Windows 10 laptops are available from Wall Mart for less than $300.00.

Participants are required to review the prerequisite course work for IBE 212 as this fundamental material will not be reviewed. It is assumed that participants know this information are totally familiar with it, and able to make measurements with the basic instrumentation used in IBE 212.

Participants are also required to purchase and read prior to arrival *Tracing EMRs in Building Wiring and Grounding*, by Karl Riley: Available at Less EMF, Barnes & Noble and Amazon for about $28.



OWON SDS7102

Seminar Synopsis

This advanced seminar amplifies the measurement and remediation techniques information learned in the Building Biology Institute seminar IBE 212: Electromagnetic Radiation. The seminar will include more detailed information on power systems, grounding, magnetic and electric fields, power system VLF fields and radio frequency radiation.

The seminar will more fully explore remediation techniques and materials along with remediation planning, costing and installation. Along with use of basic instrumentation to assess environments for EMF/EMR, advanced measurement techniques and instrumentation will be introduced. The *IBE Protocol for Measurement of Non-ionizing EMR in Low Rise Residential Buildings* will be used throughout the seminar to guide measurement technique.

Although there will be lectures to introduce new concepts and instrumentation, this seminar will be heavily devoted to lab work. In a team setting, basic and advanced equipment will be used by attendees to assess realistic environments and models constructed to produce typical problems found in buildings. Team members will discuss findings and produce remediation plans to be shared with the other teams during debriefing sessions.

This seminar conveys 24 Continuing Education Credits (CEUs), accepted by the Building Biology Institute, for which the successful completion of a comprehensive written exam will be required.

Seminar Objectives

1. Understand complexities of measuring EMR in low rise buildings including power system ELF magnetic and electric fields, Power system VLF electric fields and radio frequency radiation.
2. Understand/use specific instruments to measure specific EMRs; learn/practice how meters can be used to measure and map EMR in buildings; learn/practice data and its uses in the assessment.
3. Study and understand the IBE EMR Measurement Protocol for Low Rise Buildings.
4. Learn about various methods of shield/blocking EMR and the application criteria for each type of RF shielding.
5. Learn how to construct and cost a remediation plan for each of these energies.
6. Each student will receive as part of the course an OWON SDS7102V 2 Channel 100 MHz Bandwidth Oscilloscope with battery and case, a Pico Scope 2204A-D2 10 MHz 2 channel Oscilloscope, a Hantek CC-65 Scope ready Amp Probe , a Stetzer Ubiquitous filter (High Pass Filter) for detecting MEP/DE signals and an Extech Model 382252 Earth Resistance Tester for checking for Stray Voltage and Earth System Ground resistance with all the training to operate and create reports from the measurements made with these devices. You take this equipment back home with you with all the skills to run them.

Extech 382252 Earth Resistance Tester

Seminar Schedule

Please plan to arrive before 6:00 PM Tuesday 7-21-2020, so you do not miss the evening meal. Please do not plan to leave early on Friday, as the final day of classes will definitely run through 5:00 PM.

Classes will convene at 8:00 AM and end between 5:00 and 6:00 PM, daily. Lunches will be served 11:30 AM to 1:00 PM, and there will be breaks at 10:00 AM and 2:30 PM, daily.

Day One, Wednesday, 22 July

Grounding Concepts

1. Learning Objectives & Seminar Overview
2. Grounding Systems Design and NEC Code Compliance
    a. System Ground Design Purpose and Principles
    b. System Ground Measuring Techniques & Tools
    c. Earth Voltage Measurement Protocol and sources/remediations
3. Grounding optimization and its effects on MEP/DE
4. The Ground "Antenna" Concept, principles and results
5. Lab – Exercises – Extech Earth Resistance Tester Training and Ground Antenna Exercise
6. OWON Oscilloscope initial set up and initial readings

Day Two, Thursday, 23 July

Advanced Oscilloscope Testing, Measuring for Primary Voltage and identifying transients, peak to peak voltage and waveforms

1. Measuring for MEP/DE using a high pass filter and an Oscilloscope
2. Observing the Spectral Image of frequencies above 60 Hz
3. Source Identification techniques at the breaker panel
4. Effects of Dimmer Switches on the wave form
5. Effects of LED lights on the wave form, electric field and retina (eyes)
6. Effects of various SMPS on the wave form
7. Introduction to the PICO USB Scope, functions and limitations
8. Lab – Testing and recording of readings (including how to recover your scope to the correct settings, once you have screwed it up by pushing all the wrong buttons!)

Day Three, Friday 24, July

Spectrum Analyzers, MEP/DE Advanced Filtering, Wiring Error Detections, 5G Mitigation

1. Introduction to the RF Spectrum Analyzer
    a. Conducing a field survey for cell tower radiation patterns and exposure
2. 5G Radio Frequency Radiation Shielding Paints, the types available, application, efficacy and demo
3. Advanced Smart Meter Mitigation Techniques
4. MEP/DE advanced filtering products and applications
5. Testing for "Net Current" and remediation
6. Reporting Templates and the "5G Protection Plan", business model and financing
7. Lab - RF Measurement using a spectrum analyzer, measuring "Net Current" and testing advanced MEP/DE filters
8. Final Exam

Meet the Instructors

Bill Bathgate

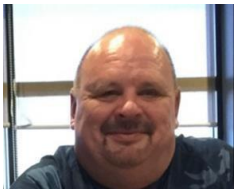
William S. Bathgate is a retired senior management professional and engineer with 40 years' experience in several high-tech industries. Mr. Bathgate is currently a BBEC student with a planned certification by Spring 2020. Mr. Bathgate previous employers include Sundstrand Corp. leading a project to modernization to the commercial aircraft "Black Box" recorder, flight controls, crash avoidance systems and aircraft power systems. Bill was also employed by IBM corporation leading engineering efforts for the S/390 Mainframe CPU and peripherals, networks and PC distributed systems. While at IBM Bill lead efforts to modernize the NASA Space Shuttle launch systems using the new PC technologies as part of the original IBM PC engineering team in Boca Raton, Florida. After IBM, Bill worked for Hewlett-Packard Co. leading instrument development of Oscilloscopes, Power Supplies, and Spectrum Analyzers, very large data center support systems (Microsoft and Amazon) and leading consulting services teams to Fortune's Top 100 corporations. After Hewlett- Packard, Bill worked for Emerson Electric as a Senior Program Manager for new product development of large utility grid grade power distribution systems. In his last work before retirement Bill lead a team of engineers in the development of autonomous navigation vehicle controls and communications at one of the "big three" auto makers. Bill holds a USA patent and has several trademarks and trade secrets in his name.

Bill currently owns two private companies, VAL-IT, Inc and DE Filters LLC.

As President of VAL-IT, Inc., he and his affiliates perform consulting work for the DoD across the Globe at military installations and field deployments in the USA and foreign countries. Bill holds a DoD Top Secret clearance in performance of this work. This business was formed in 2009 and is still going strong. There are 6 affiliates currently delivering consulting work as part of Val-IT, Inc to the DoD.

DE Filters LLC is a relatively new company that does building environmental assessments and remediations helping persons with EHS to recover from their symptoms. This business was formed in 2017. Mr. Bathgate considers this new business to be one of the most rewarding experiences of his career. When a customer says thank you for keeping them healthy and in their home, he feels blessed to have the knowledge to help them restore their health. Building Biology has dramatically enhanced those skills.

Terry Stotyn



Terry is a retired Red Sealed HVAC Refrigeration, Air Conditioning, and Controls Tradesman with over 40 years' experience in the trades. His expertise and knowledge of commercial and industrial HVAC systems, as well as power and control systems are very respected and distinguished. Terry has been an independent business owner and contractor for almost all his career, owning HVAC companies as well as other business's over the years.

Terry has been involved in the Power Testing Analysis for many years and is co- owner of two companies presently that market and distribute the Sine Tamer brand of Surge Suppression worldwide with the focus on North American sales. His expertise involves finding solutions to issues associated with Dirty Power as well

performing testing for unwanted and troublesome power entities for many large corporations that have trouble finding solutions to existing problems.

Terry was a major speaker at the recent 5G Crisis Summit held on August 26, 2019.

Terry presently is co-owner of Cratus Canada Ltd. as well as Cratus America Inc. including the www.PowerEMT.com website.

Dave Green

Dave Green is owner of Michigan EMF Specialists, a certified Building Biologist, and Electromagnetic Radiation Specialist by the Building Biology Institute. Has been doing EMF education, testing and mitigation in the Michigan, Northern Ohio and Indiana region for 4 years now.

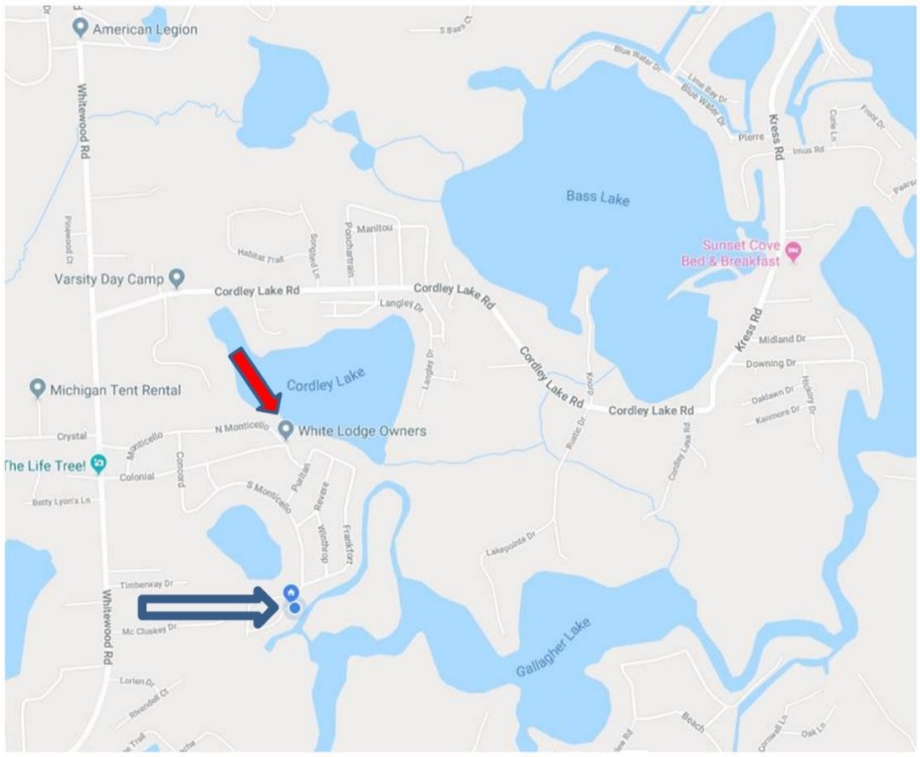
As a former Carpenter, licensed builder and experienced remodeler he uses his knowledge of building, and building science in his mitigation of EMF's in residential and small business settings. In addition to this building experience he was a secondary science teacher in public schools for 17 years in Michigan which allows him to be an effective educator on the EMF subject. He has been an IBE 312 lab assistant in 2018 at the Building Biology Institute in Santa Fe, NM, and will be a co-instructor for IBE 211 this June, as well as a lab assistant at IBE 312 in November 2020. https://michiganemf.com/

Getting There, and Lodging:

Detroit Metro International Airport serves the southeastern Michigan region, via most major airlines.

Should you wish to hire Uber for your transportation from Detroit Metro to the event, the address for White Lodge is: 3630 Colonial, Pinckney, Michigan 48169.

Alternatively, a bus leaving Detroit Metro hourly < michiganflyer.com > will transport you to Brighton. Bill Bathgate (256-570-5434) can arrange for you to be picked up in Brighton, or you can there hire an Uber.



3630 Colonial Drive, Pickney MI

White Lodge, where our workshop classes will be held, boasts ultra-low EMR reading, and is reserved, please, for those students who are EHS. The entire lodge and its grounds are reserved exclusively for this workshop, July 21 to 25th

It features six private bedrooms. The two full baths and two half baths are *not i*n suite. Overnight lodging on premises is included in your tuition. Please inform Bill Bathgate if you are willing to share a room with someone of the same gender. Overnight rooms are configured as follows:

Room 1: Two double beds, one single bed (accommodates up to three people)
Room 2: One double bed, one single bed (accommodates up to 2 people)
Room 3: Two double beds (accommodates up to 2 people)
Room 4: Two double beds (accommodates up to 2 people)
Room 5: Two double beds (accommodates up to 2 people)
Room 6: One double bed (accommodates 1 person)

This Lodge is not a Hotel, so please set your expectations accordingly: there is no check in desk, attendants, room service or laundry. Guests overnighting in the Lodge must arrive before 6:00 PM, 21 July; checkout is by 11:00 AM on 25 July. There will be bonfires, and music entertainment in the evenings.

If you'll be bringing a guest, such as a spouse, child, or significant other who will not be attending the workshop classes, the cost for their rooms and meals is $560.00 per guest.

Some attendees will be housed at the local Brighton Michigan State Park cabins about 4 miles away, which will be assigned only to the male members attending. If you are not using a car we will arrange transportation back and forth.

Note: Sleeping bags could be an option, especially for kids.

Should you opt to bring children with you, "Varsity Day Camp" that will keep them very busy all day. They serve a home-cooked lunch every day (for ages 6 thru 12). The owner of this day camp lives right across the street from the Lodge. If you are interested in this opportunity, I recommend that you make reservations quickly, as this is the most popular day camp in the area. Click here for details.

Two nearby hotels are Holiday Inn Express and Days Inn by Windham

There are also several B&Bs and AirBnBs in the Brighton area.

No alcohol nor firearms nor fireworks are permitted in the lodge or grounds. Please observe and respect a property-wide noise ordinance from 10:00 PM to 6:00 AM. Driving vehicles on the lawns is strictly prohibited.

Meals:

All meal costs are included in your tuition, and meals will be catered:
Dinner: Tuesday, Wednesday, Thursday and Friday night
Breakfast and Lunch: Wednesday, Thursday and Friday, for breakfast buffet each day there will be an on-site cook.

Please indicate any food preferences, in the instructions of the tuition payment form, such as gluten free, vegetarian, vegan, raw foods only, etc.

There is a very large double kitchen in the lodge, including two refrigerators and two stoves/ovens, so attendees may feel free to bring their own food. Pots, pans, plates, glasses and utensils are plentiful.

Friday evening, 24 July, there will be a team dinner at Zuckey Lake Tavern; we will travel there by pontoon boat and enjoy six scenic miles of the connected river and lakes. It is quite beautiful to see all the nature and luxury homes on the water. The food at Zuckey Lake is simply fabulous. The Tiki Bar upstairs overlooks the lake and there is lively music. The cost of this meal is included in all fees, except for alcohol orders, which is each diner's individual financial responsibility. Click here for the Zuckey Lake Tavern menu.

Recreational Opportunities (local):

The rural lake front community called White Lodge, where your host Bill Bathgate lives, is located not far from Ann Arbor, Michigan. Out front of the White Lodge itself is a beautiful swimming beach, along with canoes, paddle boats and kayaks free for your use. Known as Cordley Lake, it is spring fed, rated the second cleanest lake in Michigan. There is no general public access to the lake, posted "no wake," so you won't have ski boats and jet skis to deal with. Being a private Lake, no Department of natural Resources fishing license is required. If you need fishing equipment, Bill has more than any man/woman should ever own that he will share.

Fishing is excellent with Walleyes, Bass, Crappie and Northern Pike as examples. There are numerous paved and gravel bike trails both in the subdivision and less than a mile away. These are safe, off the highway bike trails. There is a large playground, basketball courts, tennis courts, and fenced dog run. Pets are not allowed in the lodge and must be leashed. Bring your beach sandals, swimsuit etc. and enjoy the beach.

In addition, we have a paved, private boat launch able to take almost any size boat that that is available for all guests that gives access to a chain of 9 connected lakes. If you want to bring your own boat that's OK. There are about 4 miles of nature trails and we have at least 6 nesting Sand Hill Cranes, various Owls and Eagles that reside year-round at the Lodge. We have several Pileated Woodpeckers in the area, which are huge birds by comparison to a regular Woodpecker and very interesting to watch.

We will lead nature hikes for those interested after dinner each night. If you live within driving distance, consider bringing a pedal bike along to ride the trails in the subdivision or on the paved bike trails just 1 mile away. Click here for additional handy info. We do have poison ivy in the subdivision so if you are sensitive to this irritant please bring some Zanfel treatment with you. We will not have medical care on site for things such as this.

Special COVID-19 considerations.

It has been arranged to conduct class in a 20 x 40-foot tent outdoors on the front lawn with enough space for distancing 6 feet apart and not wear a mask. Meals will be served in the Lodge, and students can eat indoors or out on the front lawn on picnic tables and also in the classroom tent. We will have power and high speed wired internet in the tent with all shielded power and shielded internet cables to reduce electric fields.

If you want to wear a mask, please bring your own, we will not be providing them or hand sanitizer.