Dr. Theodore Anderson has written two books on plasma antennas and is the world’s expert on this subject matter. Dr. Anderson has over 20 issued patents on plasma antennas, plasma frequency selective surfaces, plasma waveguides, and plasma MRI/PET. He has published several peer reviewed journal articles on plasma antennas and has presented at many conferences with symposium papers on plasma antennas. He has published in the areas of plasma antennas, plasma physics, electrodynamics, fluid dynamics, acoustics, hydroacoustics, atomic physics, foundations of quantum mechanics, nuclear engineering, and mathematical scattering theory. He founded Haleakala Research and Development, Inc. in 2002 which became a company focused on plasma antenna technology. His contact information is tedanderson@haleakala-research.com and cell phone 518-409-1010. The Haleakala R&D, Inc website is: www.haleakala-research.com

Dr. Anderson has been a member of the Continuing Education Institute-Europe Faculty since 2021.

**The Five Courses I Teach on Plasma Antennas.**

1. **Overview of Plasma Antennas with Applications to 5 G, telecommunications, GPS, RFID, GPR, Non-lethal Security, MRI, PET, Far-UVC, and the Drought-Flooding Cycle.**
2. **Atmospheric Plasma Antennas as a Solution to the Drought, Fire, Atmospheric Rivers, and Flooding.**
3. **Course 840 Metal, Plasma, and Metamaterial Antennas with Applications to Telecommunications and 5G.**
4. **Course 841 Metal, Plasma, and Metamaterial Antennas with Applications to Radar, Ordnance Mine Detection, and Cell Towers.**
5. **Course 842 Metal, Plasma, and Metamaterial Antennas with Applications to Plasma MRI/PET and Far-UFC Plasma Antennas to Inactivate Viruses.**
6. **Plasma Antennas Overview with Applications to 5 G, GPS, RFID, GPR, Non-lethal Security, MRI, PET, Far-UVC, and Drought-Flooding Cycle.**

Nice, France April 7-11., 2025

Instructor: Dr. Theodore Anderson

Metal and plasma antenna basics and comparisons. Applications to 5G, telecommunications in general, GPS, smart plasma antennas for superior RFID, cyber security, protection against EMP and jamming, ELF plasma antennas for geophysical explorations, communicating through the hypersonic sheath, applications to medical devices such as MRI and PET, applications to Far-UVC devises operating at 222 nm to inactivate any virus that causes pandemics, applications to stop droughts, wildfires, atmospheric rivers, and flooding, plasma metamaterials, plasma waveguides, and plasma frequency selective surfaces.

**WHO SHOULD ATTEND**

Note: Course 840 Metal, Plasma, and Metamaterial Antennas with Applications to Telecommunications and 5G, course 841 Metal, Plasma, and Metamaterial Antennas with Applications to Radar, Ordnance Mine Detection, and Cell Towers, and course 842 Metal, Plasma, and Metamaterial Antennas with Applications to Plasma MRI/PET and Far-UFC Plasma Antennas to Inactivate Viruses are not prerequisites for this course. All four of these courses are stand alone.

An undergraduate course in electromagnetic theory is essential but it will be reviewed. No background in antennas, plasma physics, or meteorology is required. Basic electromagnetics, antenna theory, and plasma physics will be taught.

**Syllabus**

Day 1.

1. Plasma antenna, gain, steerability, and reconfigurability. Advantages of plasma antennas over metal antennas.

2. Plasma frequency selective surfaces and plasma waveguides.

Day 2.

1. Applications to 5G, GPS, RFID, and GPS (ground penetrating radar).

Day 3.

1. Plasma coil MRI to enhance imaging resolution in magnetic resonance imaging.
2. Plasma PET(positron emission tomography) to make finding tumors easier.
3. Far-UVC plasma antennas operating at 222 nm wavelength to inactivate viruses that cause pandemics.
4. Plasma antennas operating at 95 GHz for non-lethal security. For example, non-lethally stopping shooters.
5. Atmospheric plasma antennas as a solution to the drought, atmospheric, and flooding cycle.

Book-Required

“Plasma Antennas second edition” by Theodore Anderson, published by Artech House in 2020.

1. **Atmospheric Plasma Antennas as a Solution to the Drought, Fire, Atmospheric Rivers, and Flooding.**

 Valencia, Spain March 17 - 19, 2025

Instructor: Dr. Theodore Anderson

Global warming of the atmosphere causes droughts followed by atmospheric rivers and flooding. When the temperature of the atmosphere increases the atmosphere can hold more water vapor or moisture. Because water vapor is a greenhouse gas, it heats up the atmosphere even more and it can hold even more water vapor. There is a viscous cycle from water vapor in the atmosphere and the heating of the atmosphere. The warmer the atmosphere, the more moisture it can hold. The atmosphere holds the moisture without letting it go and you have droughts. Eventually the atmosphere accumulates so much water vapor, it can't hold it and just dumps it in the form of atmospheric rivers and flooding. Hence there is a cycle of droughts to atmospheric rivers to flooding.

Atmospheric plasma antennas that are not in the transmit and receive mode, but just plasma beams launched from lasers mounted on aircraft can activate and enhance rainfall. The ions injected into the atmosphere will cause raindrop coalescence and subsequent rainfall.

This will result in having moderate rainfall spaced at moderate intervals of time instead of droughts followed by atmospheric rivers and flooding.

There is a type of laser that works for stopping droughts, atmospheric rivers, and flooding. Another type of laser works for dousing fires because some of the ions can ride the smoke particles.

Please see the 3 attachments for background information.

"On 29 October 2024, torrential rain caused by an isolated low-pressure area at high levels brought over a year's worth of precipitation to several areas in eastern Spain, including the Valencian Community, Castilla–La Mancha, and Andalusia. The resulting floodwaters caused the deaths of 226 people, with 14 missing and substantial property damage. It is one of the deadliest natural disasters in Spanish history.—Wikipedia

"The study shows a “strong link” between increasing temperatures and decreasing rainfall in Spain over the past 50 years. Between 1971 and 2022, rainfall diminished at a rate of 0.93 mm a year, taking the country towards greater bouts of drought that have been impacting citizens and workers."—Google.

WHO SHOULD ATTEND

Note: Course 840 Metal, Plasma, and Metamaterial Antennas with Applications to Telecommunications and 5G, course 841 Metal, Plasma, and Metamaterial Antennas with Applications to Radar, Ordnance Mine Detection, and Cell Towers, and course 842 Metal, Plasma, and Metamaterial Antennas with Applications to Plasma MRI/PET and Far-UFC Plasma Antennas to Inactivate Viruses are not prerequisites for this course. All four of these courses are stand alone.

An undergraduate course in electromagnetic theory is essential but it will be reviewed. No background in antennas, plasma physics, or meteorology is required. Basic electromagnetics, antenna theory, and plasma physics will be taught.

**Syllabus**

Day 1.

1. Introduction to plasma antennas including atmospheric plasma antennas.

2. The physics of atmospheric warming due to global warming.

3. The physics that connects droughts, fires, atmospheric rivers, and flooding.

4. The physics of raindrop coalescence.

5. The physics of using atmospheric plasma antennas to cause raindrop coalescence and rainfall.

Day 2.

1. Using atmospheric plasma antennas to activate and enhance rainfall to stop droughts and wildfires.

2. Atmospheric plasma antennas to douse wildfires.

Day 3.

1. Using atmospheric plasma antennas to stop atmospheric rivers and flooding.

2. Conclusions and what to do next.

Book-Required

“Plasma Antennas second edition” by Theodore Anderson, published by Artech House in 2020.

1. **Course 840 Metal, Plasma and Metamaterial Antennas with Applications to Telecommunications and 5G.**

COURSE CONTENT

The course content will consist of metal, plasma, antennas, metamaterial, and plasma metamaterial antennas, frequency selective surfaces and waveguides. Applications of artificial intelligence will be discussed.

The industrial applications will be in telecommunications, 5G, GPS, high gain and electrically small antennas that could be used in cell phones, antenna arrays and smart antennas. Applications of Artificial Intelligence will be discussed.

WHO SHOULD ATTEND

Note: Course 841 Metal, Plasma, and Metamaterial Antennas with Applications to Radar, Ordnance Mine Detection, and Cell Towers and course 842 Metal, Plasma, and Metamaterial Antennas with Applications to Plasma MRI/PET and Far-UFC Plasma Antennas to Inactivate Viruses are not prerequisites for this course. All three of these courses are stand alone.

An undergraduate course in electromagnetic theory is essential but it will be reviewed. No background in antennas or plasma physics is required. Basic electromagnetics, antenna theory, and plasma physics will be taught.

Day 1.

1. Introduction to metal, plasma, metamaterial, and plasma metamaterial antennas, frequency selective surfaces, and waveguides.

2. Applications to metal, plasma, and metamaterial smart antennas.

3. Steering and shaping antenna beams using metal arrays and plasma physics.

4. Applications of artificial intelligence will be discussed.

Day 2

1.Applications to telecommunications with metal, plasma, and metamaterial antennas.

2. Applications to 5G with metal, plasma, and metamaterial antennas.

3. Applications to high gain and electrically small metal, plasma, and metamaterial antennas that could fit in cellphones.

4. Applications of artificial intelligence will be discussed.

Day 3

1. Applications to GPS with metal, plasma, and metamaterial antennas.

2. Steering antenna beams using refraction of electromagnetic waves through a plasma.

3. Focusing antenna beams using refraction of electromagnetic waves through a plasma.

4. Applications of artificial intelligence will be discussed.

1. **Course 841 Metal, Plasma, and Metamaterial Antennas with Applications to Radar, Ordnance Mine Detection, and Cell Towers.**

Nice, France April 07 - 09, 2025

This 3-day course will consist of industrial applications of metal antennas, plasma antennas, metamaterial antennas, and plasma metamaterial antennas. This will include industrial applications to Radar, ordnance mine detection, co-site Interference, various antennas, and cell towers. Applications of artificial intelligence will be discussed.

Specific antennas to be discussed are smart antennas, satellite antennas, and reflector antennas. reduction of co-site interference, radiation patterns, smart plasma antenna, high power plasma antennas, reflector plasma antennas, pulsing plasma antennas, and how to make a basic plasma antenna.

WHO SHOULD ATTEND

Courses 840 and 842 are not prerequisites for Course 841. All three of these courses are stand alone.

An undergraduate course in electromagnetic theory is essential but it will be reviewed. No background in antennas or plasma physics is required. Basic electromagnetics, antenna theory, and plasma physics will be taught.

Day 1.

1. Review of metal, plasma, metamaterial, and plasma metamaterial antennas, frequency selective surfaces, and waveguides.

2. Applications to Radar.

3. Applications to ground penetrating radar with ordnance mine detection. Buried ordnance mines are a problem in many places of the world.

4. Applications of artificial intelligence will be discussed.

Day 2.

1. Applications to electromagnetic interference and co-site interference.

2. Applications to biconical, helical, spiral and aperture antennas. Each of these antennas have a wide range of antenna applications.

3. Applications to cell towers.

4. Applications of artificial intelligence will be discussed.

Day 3

1. Applications to reconfigurable plasma waveguides.

2.Applications to frequency selective surfaces for electromagnetic filtering.

3. Applications to reconfigurable frequency selective surfaces radomes.

4. Applications of artificial intelligence will be discussed.

1. **Course 842 Metal, Plasma, and Metamaterial Antennas with Applications to Plasma MRI/PET and Far-UFC Plasma Antennas to Inactivate Viruses**

Amersfoort, The Netherlands May 19 - 21, 2025

WHO SHOULD ATTEND

Courses 840 and 841 are not prerequisites for Course 842. All three of these courses are stand alone.

An undergraduate course in electromagnetic theory is essential but it will be reviewed. No background in antennas or plasma physics is required. Basic electromagnetics, antenna theory, and plasma physics will be taught.

Day 1.

1. Review of metal, plasma, metamaterial, and plasma metamaterial antennas, frequency selective surfaces, and waveguides.

2. Applications of antenna arrays and electronic steering arrays using metal, plasma, and metamaterial antennas.

3. Plasma antennas operating at 95 GHz for non-lethal (harmless to humans) security.

4. Applications of artificial intelligence will be discussed.

Day 2

1. Ground penetrating radar with metal, plasma, metamaterial antennas with examples to find ordnance mines buried in the ground.

2. Plasma antennas a operating at 222 nm as an Far-UVC device to inactivate SARS-CoV-2 and other viruses that cause pandemics.

3. Plasma RF and gradient coils in MRI and PET technology to enhance imaging, reduce interference, eliminate banging noise, and make it easier to find small and early stage tumors.

4. Applications of artificial intelligence will be discussed.

Day 3.

1. Communicating through the plasma sheath around a hypersonic vessel. This plasma sheath causes communications blackouts when space vehicles re-enter the earth's atmosphere. The plasma sheath will be treated as a traveling or surface wave plasma antenna.

2. Tracking hypersonic vessels with plasma antenna arrays which are faster than electronic steerable metal arrays.

3. Atmospheric plasma antennas to activate and enhance rain to solve drought and forest fire problems.

4. Applications of artificial intelligence will be discussed.