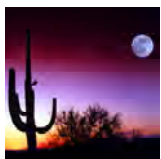




***2022 Winter Conference on
Plasma Spectrochemistry***
Tucson, Arizona
January 17 - 22, 2022
El Conquistador Tucson
A Hilton Resort



2022 Winter Conference on Plasma Spectrochemistry
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Dr. Ramon M. Barnes, Conference Chairman



2022 Winter Conference on Plasma Spectrochemistry

Tucson, Arizona, January 17 – 22, 2022

Plasma Spectrochemistry for Trace Element, Stable Isotope, Elemental Imaging and Speciation Analyses

The 2022 Winter Conference on Plasma Spectrochemistry, 22nd in a series of biennial meetings sponsored by the *ICP Information Newsletter*, features developments in plasma spectrochemical analysis by inductively coupled plasma (ICP), dc plasma (DCP), microwave plasma (MIP), glow discharge (GDL, HCL), and laser sources (LA, LIBS, LAMIS). The meeting will be held Monday, January 17 through Saturday, January 22, 2022, in Tucson, Arizona, (www.visitTucson.org) at the El Conquistador Tucson Resort (www.hiltonelconquistador.com). Professional development short courses at introductory and advanced levels and manufacturers' seminars will be offered Friday through Tuesday, January 14 - 18. Spectroscopic instrumentation and accessories will be shown during a three-day exhibition from January 18 to 20, and workshops on New Plasma Instrumentation, Clinical ICP-MS, Isotope Analysis, Elemental Imaging and Mass Cytometry, and Elemental Speciation methodology will be presented Tuesday through Friday afternoons.

Objectives and Program

The continued growth in popularity of plasma sources for atomization and excitation in atomic spectroscopy and ionization in mass spectrometry and the need to discuss recent developments of these discharges in spectrochemical analysis stimulated the organization of this meeting. The Conference will bring together international scientists experienced in applications, instrumentation, and theory in an informal setting to examine recent progress in the field. Approximately 400 participants from 20 countries are expected to attend.

Over 200 papers describing applications, fundamentals, and instrumental developments with plasma sources will be presented in lecture and poster sessions by more than 200 authors. Symposia organized and chaired by recognized experts will include the following topics: 1) Sample introduction and transport phenomena; Micronebulization and flow processing spectrochemical analysis; 2) Nanomaterial analysis and characterization; 3) Elemental speciation, metallomics and sample preparation for speciation; 4) Plasma instrumentation, including advanced detectors, chemometrics, expert/smart systems, on-line analysis, microplasmas, software, and remote-system automation; 5) Sample preparation, treatment and automation; 6) Excitation mechanisms, plasma phenomena and modeling; 7) Spectroscopic standards and reference materials, and high-purity materials; 8) Plasma source mass spectrometry; 9) Glow discharge atomic and mass spectrometry; 10) Stable isotope analyses; 11) Laser-assisted plasma spectrometry; 12) Advanced materials bulk and surface characterization, 13) Elemental imaging and mass cytometry, and 14) Novel plasma spectrochemical applications. Six plenary and 34 invited lectures will highlight advances in these areas. Four afternoon poster sessions will feature applications, automation, and new instrumentation. Six Heritage Lectures will be presented by distinguished scientists and investigators, who have contributed significantly to the development of plasma spectrochemistry and will address critical development areas in sample introduction, instrumentation, elemental speciation, plasma source mass spectrometry, and novel software and hardware. Awards for outstanding young investigators and senior researchers also will be presented. Plenary, invited, and submitted papers will be published in September 2022 after peer review as the official Conference proceedings.

Schedule of Activities

Call for Papers, Preliminary Abstracts Due, Early Bird Registration	Friday, July 23, 2021
Exhibitor Booth Reservation and Pre-Registration Due	Friday, September 24, 2021
Final Abstracts for All Papers Due	Friday, October 22, 2021
Exhibitor Reservation Deadline	Friday, October 22, 2021
Conference Pre-Registration Deadline	Friday, October 22, 2021
Hotel Reservation Deadline	Friday, December 20, 2021
Late Pre-Registration Deadline	Friday, December 17, 2022
2022 Winter Conference Professional Development Courses	Friday - Monday, January 14 - 17, 2022
2022 Manufacturers' Seminars	Friday - Monday, January 14 - 17, 2022
2022 Winter Conference on Plasma Spectrochemistry	Monday - Saturday, January 17 - 22, 2022
2022 Special Topic Workshops	Tuesday - Friday January 18 - 21, 2022
2022 Instrument Exhibition	Tuesday - Thursday, January 18 - 20, 2022
Conference Manuscripts Submission Deadline	February 21, 2022

Daily Schedule of Activities

Friday, January 14, 2022	7:00 am - 9:00 pm	Short Course Registration (Conference Registration)
	8:00 am - 11:00 pm	Short Courses (Breakout rooms)
		Session 1 1 pm - 5 pm
Saturday, January 15	7 am - 4:30, 6:30 pm	Session 2 7 pm - 11 pm
	8:00 am - 11:00 pm	Short Course Registration (Conference Registration)
		Short Courses (Breakout rooms)
Sunday, January 16	7:30 am - 10 pm	Session 3 8 am - noon
	8:00 am - 11:00 pm	Session 4 1 pm - 5 pm
		Session 5 7 pm - 11 pm
Monday, January 17	6:00 pm - 8:00 pm	Registration (Conference Registration)
	7:00 am - 9:00 pm	Short Courses (Breakout rooms)
	8:00 am - 5:30 pm	Session 6 8 am - noon
Tuesday, January 18	5:30 pm - 6:30 pm	Session 7 1 pm - 5 pm
	6:30 pm - 8:30 pm	Session 8 7 pm - 11 pm
	7:00 pm - 11:00 pm	Welcome Social Mixer (Presidio Ballroom Foyer)
Wednesday, January 19	7:30 am - 8:00 pm	Registration (Conference Registration)
	8:00 am - 6:30 pm	Conference Session (Presidio Ballroom)
	9:00 am - 6:30 pm	Exhibition (Turquoise Ballroom, Foyer)
Thursday, January 20	3:00 pm - 6:30 pm	Poster Session (Turquoise Ballroom)
	3:10 pm - 5:30 pm	Workshop on Plasma Instrumentation (Presidio Ballroom)
	5:30 pm - 6:30 pm	Heritage Lecture (Presidio Ballroom)
Friday, January 21	6:30 pm - 8:00 pm	Social Mixer (Turquoise Ballroom)
	7:00 pm - 11:00 pm	Session 10 Short Courses (Breakout rooms)
	7:30 am - noon	Registration (Conference Registration)
Saturday, January 22	8:00 am - 6:30 pm	Conference Session (Presidio Ballroom)
	8:00 am - 9:00 am	Exhibition (Turquoise Ballroom)
	8:00 am - noon	Poster Session (Turquoise Ballroom)
	1:00 pm - 5:00 pm	Workshop on Clinical ICP-MS (Presidio Ballroom)
	3:50 pm - 6:00 pm	Heritage Lecture (Presidio Ballroom)
	6:00 pm	Social Mixer (Presidio Ballroom Foyer)
		Registration (Conference Registration)
		Conference Session (Presidio Ballroom)
		Heritage Lecture (Presidio Ballroom)
		Session 10 Short Courses (Breakout rooms)
		Session 11 Short Courses (Breakout rooms)
		Workshop on Novel Instrumentation (Presidio Ballroom)
		Conference Closing (Presidio Ballroom)

2022 Winter Conference on Plasma Spectrochemistry Tucson, Arizona, January 17 – 22, 2022

Conference Background

THE MEETING

The biennial **Winter Conference on Plasma Spectrochemistry** is sponsored by the ICP Information Newsletter, Inc., a nonprofit, philanthropic research organization located in Hadley, Massachusetts and Lehigh Acres, Florida, and organized by Dr. Ramon Barnes of the University Research Institute for Analytical Chemistry. Previous meetings were held in Arizona, California, Florida, Hawaii, and Puerto Rico (Table). Attendance has grown from 170 in 1980 to more than 600 with worldwide scientific participation representing 30 countries. Technical sessions comprise lectures and posters describing application, fundamental, and instrumentation developments with popular electrical plasma sources. The inductively coupled plasma (ICP), glow discharge sources, microwave induced plasma, direct current plasma, and laser-assisted plasma spectrochemistry are featured. New spectrometric instrumentation, novel sample introduction systems, plasma system automation, sample preparation approaches, elemental speciation, spectroscopic standards, quality assurance, new diagnostic methods, and theoretical treatments are highlighted. More than 300 technical papers are presented, and selected papers have been published together as the Conference proceedings in *Spectrochimica Acta, Part B* (1981-1987), *Journal of Analytical Atomic Spectrometry* (1988-2020), and *Journal of Analytical Bioanalytical Chemistry* (1998-2006). The proceedings of the 2022 Winter Conference will appear in these major spectroscopy journals during Fall 2022.

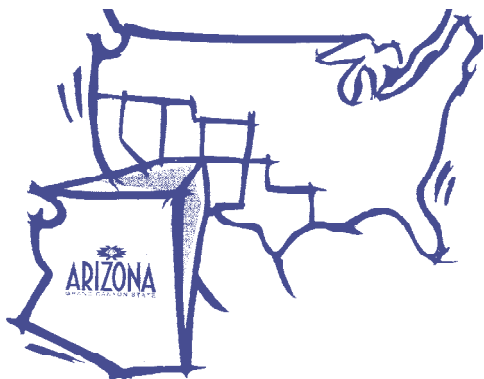
Some in the field consider the Winter Conference one of the technically most significant meetings convened on these topics. Eighteen European Winter Conferences have been held as well (Table). The next European Winter Conference will be in Lubljana, Slovenia (February 2023). Seven Asia-Pacific Winter Conferences have been held in China, Japan, Korea, and Thailand (Table).

THE PEOPLE

The Winter Conference attempts to bring together the major figures in the field of plasma spectrochemistry in a comfortable and informal setting to promote maximum information exchange and conversations. We accomplish this by inviting keynote speakers, employing principals to organize and chair sessions and discussions, and by offering technical short courses taught by experts. Furthermore, experienced and novice analytical chemists seeking to share and expand their experiences in plasma spectrochemistry participate actively. Invited speakers include distinguished international experts and award recipients. Heritage lecturers, workshops, and symposia will be arranged and chaired by many of the leaders in the field.

THE LOCATION

Warm-weather sites are selected for the Winter Conference to promote the relaxed atmosphere conducive to effective scientific information exchanges. The 2022 Winter Conference will be held at the El Conquistador Tucson, a Hilton Resort, located in Tucson, Arizona, only 20 minutes north of the Tucson International Airport (www.flytucson.com) and conveniently served by major interstate highways. Tucson is 115 miles (184 km) south of Phoenix.



Winter Conference on Plasma Spectrochemistry

Year	City	State
1980	San Juan	Puerto Rico
1982	Orlando	Florida
1984	San Diego	California
1986	Kailua-Kona	Hawaii
1988	San Diego	California
1990	St. Petersburg	Florida
1992	San Diego	California
1994	San Diego	California
1996	Fort Lauderdale	Florida
1998	Scottsdale	Arizona
2000	Fort Lauderdale	Florida
2002	Scottsdale	Arizona
2004	Fort Lauderdale	Florida
2006	Tucson	Arizona
2008	Temecula	California
2010	Fort Myers	Florida
2012	Tucson	Arizona
2014	Amelia Island	Florida
2016	Tucson	Arizona
2018	Amelia Island	Florida
2020	Tucson	Arizona

European Winter Conference on Plasma Spectrochemistry

Year	City	Country
1985	Leysin	Switzerland
1987	Lyon	France
1989	Reutte	Austria
1991	Dortmund	Germany
1993	Granada	Spain
1995	Cambridge	England
1997	Gent	Belgium
1999	Pau	France
2001	Harjell	Norway
2003	Garmisch-Partenkirchen	Germany
2005	Budapest	Hungary
2007	Taormina	Italy
2009	Graz	Austria
2011	Zaragoza	Spain
2013	Krakow	Poland
2015	Münster	Germany
2017	St Anton	Austria
2019	Pau	France
2023	Lubljana	Slovenia

Asia-Pacific Winter Conference on Plasma Spectrochemistry

Year	City	Country
2005	Chiang Mai	Thailand
2006	Bangkok	Thailand
2008	Tsukuba	Japan
2010	Chengdu	China
2012	Jeju	Korea
2015	Xiamen	China
2017	Mastue	Japan



YEAR-ROUND CLIMATE						
	FAHRENHEIT		CELSIUS		HUMIDITY	RAINFALL
	MAX	MIN	MAX	MIN	AT MAX TEMP	IN INCHES
JANUARY	65	37	18	4	33%	.89
FEBRUARY	69	40	20	5	27	.84
MARCH	74	43	23	7	23	.76
APRIL	82	50	27	10	16	.39
MAY	90	57	32	14	13	.18
JUNE	100	67	38	20	13	.27
JULY	101	74	37	23	27	2.04
AUGUST	98	72	36	22	33	2.13
SEPTEMBER	95	67	34	20	26	1.16
OCTOBER	86	55	29	14	25	.75
NOVEMBER	74	44	23	8	28	.77
DECEMBER	66	38	18	4	35	.98
AVERAGE	83	54	28	13	25%	11.16 YEARLY



Tucson — The Beginning of a Rich Western Culture (www.ci.tucson.az.us, www.visitTucson.org)

With its mixed cultural heritage and international population, and with the world's most amazing saguaro cactus forest and the most luxurious man-made spas, Tucson is a celebration for the senses and a visitor's dream. Spanish, Mexican, and Native American influences are resplendent throughout the City. Though Tucson is known for its colorful and creative culture, it's loved for its beautiful resorts and guest ranches. Tucson is located in south-central Arizona along the banks of the Santa Cruz River where Interstates 10 and 19 meet. It is situated in a high desert valley surrounded by four mountain ranges: the Santa Catalinas to the north, the Rincons to the east, the Santa Ritas to the south and the Tucsons to the west. Tucson has more sunshine than any other city in the United States, about 350 days each year, and low year-round humidity makes high temperatures comfortable. Winter (November-March) temperatures average highs of 65°F (18°C) and an average low of 38°F (4°C) (<http://www.wunderground.com/US/AZ/Tucson.html>).



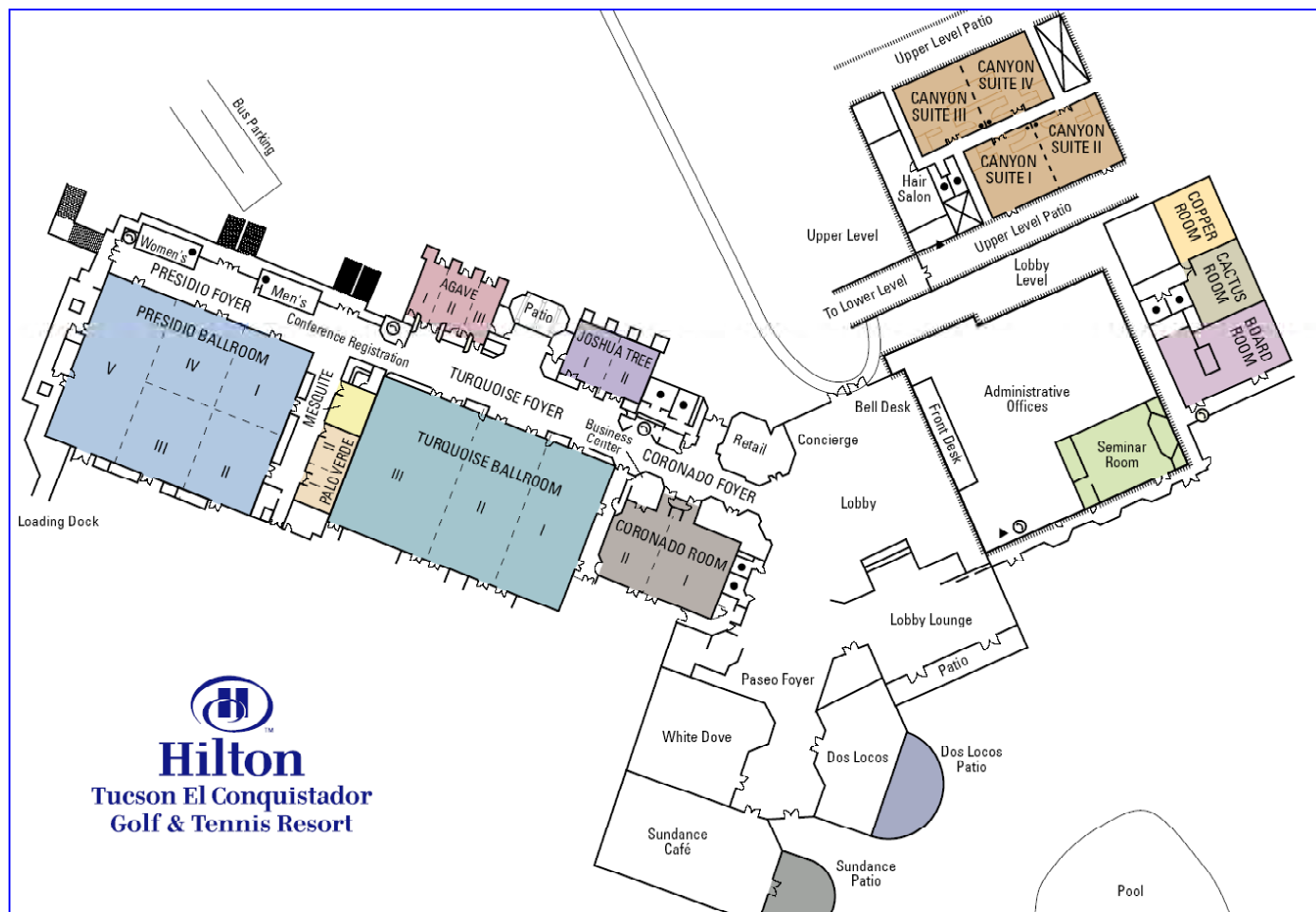
El Conquistador Tucson, a Hilton Resort (www.HiltonElConquistador.com)

A luxury destination resort just northwest of Tucson, the **Hilton El Conquistador Tucson Resort** is set amidst 500 acres in the foothills of the Santa Catalina Mountains in scenic Oro Valley. This beautiful 428-room resort is ideal for conferences or anyone seeking a recreational paradise. The granite cliffs of the Pusch Ridge rise approximately

2000 feet above the resort, providing breathtaking views. Recreationally, the resort offers 45 holes of championship golf, 31 lighted tennis courts, four sparkling pools, spa therapy, and horseback riding.

The venue, atmosphere and service bring out the best in any event. The El Conquistador offers among the most resort meeting space in Southern Arizona - 28 event spaces, plus outdoor venues totaling over 100,000 ft². Tucson's fabulous weather makes for a perfect event. The Presidio Ballroom accommodates 780 schoolroom style,





and the adjacent Turquoise Ballroom exhibition area (11,280 ft² = 120 ft by 94 ft) and Foyer houses up to 50 exhibition booths and 70 poster boards. In total this provides uncrowded space for the meeting and exhibition, posters, receptions, and conversations.

The Hilton El Conquistador Tucson is minutes away from the airport, downtown, the University of Arizona, and almost every place in Tucson.

Directions From Tucson International Airport (www.flytucson.com) follow I-10 West to Ina Road (Exit 248). Turn right on Ina Rd. and travel east for about 5.3 miles to Oracle Road. Turn left onto Oracle and continue 2.5 miles to El Conquistador Way. Turn right and the Resort will be on the right.

From Phoenix follow I-10 East to Ina Road (Exit 248). Turn left on Ina Rd. and travel east for about 5.3 miles to Oracle Road. Turn left onto Oracle and continue 2.5 miles to El Conquistador Way. Turn right and the Resort will be on the right.

THE SCHEDULE

The 2022 Winter Conference will include activities beginning on Sunday, January 16, and continuing through Saturday, January 22. The Conference will be preceded on Friday, January 14, through Monday, January 17, by 50+ fee-based, professional short courses, each lasting four hours and presented by experts on specific topics. Simultaneously, exhibitors and other providers of plasma spectrochemical instruments, supplies, and related products will offer free seminars, training programs, or user's meetings. The Conference begins with a social mixer Sunday evening, January 16, and convenes daily at 8:00 am until 6:30 pm. Lectures, posters, and panel discussions will be presented. Social gatherings are planned for evenings, and a Conference dinner is scheduled for Thursday evening, January 20 at the El Conquistador Tucson.

INSTRUMENT EXHIBITION

The three-day exhibition will open on Monday evening at 6:30, January 17, with a reception in the Turquoise Ballroom exhibition area. Spectroscopic instrumentation and chemicals, glassware, publications, and software supporting plasma spectroscopy will be displayed by approximately 40 companies and organizations. Typically, new plasma spectrochemical instrumentation is previewed here.

MANUFACTURER'S SEMINAR PROGRAM FOR PLASMA INSTRUMENTATION

During the weekend Short Course program, Friday through Sunday, January 14 to 16, exhibitors and/or producers or distributors of plasma spectrochemical instruments, supplies, and related products will present four-hour seminars, training/education programs, or user's meetings. This program is free, although registration will be required. New or advanced customer

training, product introduction and/or demonstrations, product line descriptions, or user's group meetings and discussions are included. These seminars will be presented in parallel with the fee-based short courses.

SPECIAL WORKSHOPS

Special topic workshops on new plasma instrumentation, clinical applications of ICP-MS, isotope analysis, and elemental speciation methodology will be held Tuesday through Friday afternoons, January 18 - 21, from 3:05 to 5:20 pm, with presentations on applications, plasma instrumentation, novel methodologies and procedures, and sample preparation. On Tuesday instrument manufacturers will describe new plasma source developments, and exhibitors will discuss sample introduction, alternative sources, and sample preparation. The afternoon program will parallel the exhibition and poster session. The new plasma instrumentation workshop program includes plasma source (ICP) atomic emission and mass spectrometry, and plasma accessories (e.g., chromatographic interface, electrothermal vaporizer, laser and spark ablation, special nebulizers, preconcentration and sample introduction equipment, special adapter kits), standards and sample preparation. Representatives from companies and/or exhibitors will present brief technical descriptions and discussions of their novel products and design philosophy.



ACTIVITIES AND ATTRACTIONS

Golf

Tucson has long been a favorite golfing getaway for celebrities and others drawn to the city's fair weather, casual lifestyle and secluded setting. No longer a well-kept secret retreat, Tucson is quickly gaining a reputation as a premier golf destination among enthusiasts worldwide. In fact, *Conde Nast Traveler Magazine* and *Golf Digest* have both recognized Tucson courses among the best in the world. The city is home to dozens of resorts, clubs and public courses that challenge every level of play. Of these, players can choose from a range of traditional courses to desert target layouts. The majority of courses are accessible to visitors. With more than 40 courses to choose from, golf is Tucson's number-one sports attraction. Winter's fair skies make January through April the prime season. The nine-hole Pusch Ridge course surrounds the hotel.



Arizona — The Grand Canyon State (www.visitarizona.com/places-to-visit/tucson-southern-arizona/tucson; www.arizonascenicroads.com)

Arizona is a wondrous place, both geographically and culturally diverse, rich with tradition and yet young. The state was 100 years old on Valentine's Day 2012. Few travel destinations offer so great a change of scenery in so little time. Begin a visit with a flight into Phoenix, the capital city of Arizona and one of the most easily accessible cities in the nation with direct flights from some 84 cities. Within a four-hour drive in any direction, you'll find yourself in completely different surroundings. Certain times of the year you could actually ski twice in one day – on both snow and water.

Don't be in a rush to leave Phoenix however, as you will find more to see and experience than you can imagine. What is your pleasure? Numerous tour operators offer a wide variety of desert sight-seeing adventures, including beautiful sunsets and moonlight magic. While enjoying the desert, add extra excitement with river rafting, paintball games, target shooting, hot air balloon rides, soaring lessons or sky diving. If you like speed, try driving lessons at a world class driving school or enjoy a NASCAR or drag race.

Arizona boasts vast open spaces and scenic beauty from the high lush desert area south of Tucson to the magnificent Grand Canyon area. Ranges of mountains rise from the desert floor throughout the Sonoran desert region. As you travel northward, pine covered mountain slopes lead upward to snow capped peaks in Flagstaff and in the White Mountain area which extends along the eastern state line. In areas like Sedona and Monument Valley, reddish rock formations composed of layers of volcanic rock, sandstone, limestone and shale, give the landscape striking colors and unique formations. Rock hounds find the state rich with gems and minerals created by millions of years of geological activity.

Here the night skies are some of the darkest in the country, and amateur and professional and stargazers enjoy hundreds of cloudless nights. The far reaches of the galaxy can be explored in the state's numerous observatories, planetariums and through telescopes on patios and balconies of the resorts.

Perhaps no better location in the state illustrates the extreme variety of geography in Arizona that a roadway on the northeast side of Tucson, the Sky Island Parkway or the Catalina Highway. A drive on this road takes travelers through five "life zones," beginning in the desert and ending above 9000 feet in a conifer forest at the top of Mount Lemmon. This single, 27-mile drive passes through as many life zones as a drive from the Mexican to the Canadian border.

For those who wish to experience the Old West beyond cowboy cookouts and camp fires, visit the Territorial Prison in Yuma or take a trip to the OK Corral in Tombstone followed by a stop in Bisbee. Prescott, the original territorial capital, is built around the traditional courthouse town square and buildings in the area are carefully preserved. Several of the "Whiskey Row" bars still use the old hand-carved, ornamented back bars of the late 1800's.

Arizona is home to 22 different Native American tribes with the most reservation land in the United States. Various cultural centers and museums display beautiful hand-crafted pottery, baskets,



jewelry, blankets and crafts from our numerous tribes. From ancient cliff dwellings and ruins to thriving casinos, Native American culture plays a leading role in Arizona. Over the years, Arizona has developed a worldwide reputation as a destination that showcases a rich history and a variety of cultural heritages. The state's 22 Indian nations provide visitors with a glimpse of Native American cultures and an opportunity to explore one-of-a-kind monuments and ancient dwellings.

Hopi is the only puebloan tribe of Arizona. Located in Northeastern Arizona, Hopi offers tours of the majestic mesas, where families continue to reside within ancient family dwellings. The visitor is introduced to the vast beauty of the land, its people, culture and commerce. Highly skilled as artists, the Hopi offer quality, hand crafted pottery, katsina doll carvings, hand painted pictures, silver overlay jewelry and basketry. For a complete listing of tour guides and artists, visit hopibiz.com. This website offers a range of information for the visitor.

The ancient lands of the Hualapai Tribe include incredible panoramic vistas unequalled in all of Arizona with pristine wilderness untouched by the 21st century world. With the tribe's Grand Canyon West Tour, experience first-hand the beauty of the Grand Canyon from sunrise to sunset on a journey of a lifetime. Inaccessible to outsiders, this tour gives the opportunity to discover and survey the ancient lands of the Hualapai Tribe by hiking the trails of long ago, viewing the canyon walls from a helicopter, taking a ride on the Colorado River, whitewater rafting or just taking some time to soak in the natural beauty. The Gila Indian Center, a nonprofit tribal corporation of the Gila River Indian Community, features authentic American Indian crafts, a free historical museum and full-service restaurant with some of the best Indian fry bread around. At Nohwike' Bagowa, the White Mountain Apache Tribe's Cultural Center and Museum, visitors may explore four miles of trails, visit exhibits in an 1871 log cabin, walk down Officers' Row, and take a short drive to Kinishba Ruins National Historic Landmark. With the Yavapai-Apache Nation's Native Visions, you'll journey into history with those who know best. You'll view early Native American dwellings including Montezuma Castle and the majestic red cliffs indigenous to their land. Fort McDowell Yavapai Nation is presenting Native Trails at Scottsdale's Culture Quest. The program will debut its season of free noontime festivals dedicated to exploring the rich and varied cultures of Native America.



The Mexican cultural influence can be seen throughout the state, evidenced by missions and presidios established by Franciscan monks in the early 1700's. Hispanic names abound for shopping centers, residential developments, streets, schools and parks. The language, food, music, art, architecture, entertainment and traditions of Latin peoples are deeply infused in the culture of the state.

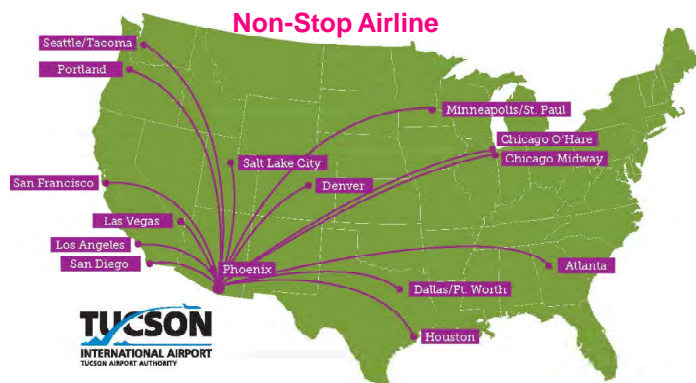
The grandeur of Arizona is beyond description in words, it must be experienced first hand – from magnificent sunrise to breathtaking sunset and into star studded night skies. Come see for yourself. We know you will return bringing with you a host of your colleagues, friends and family as there is no place like Arizona.

Tucson (www.tucsonaz.gov, www.visitTucson.org)

"Tucson" is derived from the Tohono O'Odham Native American word *Stjukshon* (pronounced Chuk-son) for "spring at the foot of black mountain". The "black mountain" is just southwest of downtown, which is known as "A" Mountain, named for its white-rock letter "A" painted by University of Arizona students since 1915. UA was founded in 1885, and today it serves over 35,000 students. The "spring" was the Santa Cruz River, the remains of which is a sweeping sand "wash" where water still flows beneath the sand and rocks of the riverbed. Present day Tucson was founded by an Irishman (Hugh O'Connor), who served in the Spanish Army. In 1775 he established the Presidio of San Augustin de Tucson in what is now the heart of downtown Tucson in the historic El Presidio neighborhood. Tucson is the oldest continually inhabited settlement in the United States, and evidence of a settlement dated back to the Cienega phase (800 B.C. to 150 A.D. was uncovered in 1997. Five flags have flown over Tucson (i.e., Spain, Mexico, U.S. Confederacy, the Union, and the USA). Tucson joined the United States with the Gadsden Purchase in June 1854. Tucson's population has grown from 3,200 in 1869 to over a million in 2008.

Encompassing a 500-square-mile valley, Tucson is Arizona's second-largest city and offers every amenity imaginable. Surrounded by five mountain ranges, Tucson is a perfect hub for nature lovers who are set on exploring Arizona's varied terrain. Easily accessible by the Tucson International Airport, the city is served by major airlines with connections to U.S. and international cities. Nonstop air service is available to major destinations throughout the nation and to Mexico. Shuttle service is available to and from Phoenix Sky Harbor International Airport (a 90-minute drive).

Tucson International Airport (www.flytucson.com) provides service throughout the world. The airport is served by seven major airlines with direct connections to 20 major U.S. cities and international destinations, with a connecting time of 90 minutes or less. TUS is a U.S. Port of Entry with 24-hour U.S. Customs and Border Protection services. The airport is conveniently located, and is close to both the foothill resorts and downtown. Ground transportation is equally convenient to Tucson, with Phoenix a two-hour road trip away.



Activities and Attractions (see www.tucsonattractions.com)

Tucson is also a haven for hikers and cyclists. Surrounded by five mountain ranges with hundreds of trails, travelers can hike year round – the mild winters allow hiking in the lower elevations and in summer the trails of the high mountains are perfect getaways. Tucson is the gateway to Saguaro National Park, which is located on both sides of the city. **Saguaro National Park** offers numerous trails for pedestrians and peddlers that wind between large saguaros. The Sonoran Desert is the only place in the world where the giant saguaro cactus grows. Home to the world's most recognizable cactus, Saguaro National Park showcases the majesty of the saguaro. Forests of huge saguaro cactuses populate the park, and visitors can choose from more than 150 miles of hiking trails. Hiking is possible even in summer in the early mornings and late afternoons,



or, for a change of pace, Mt. Lemmon offers cool summer hiking through pine-tree forests. One of Tucson's most unique features is nearby Mt. Lemmon, which boasts, of all things, a ski resort. Located in the Santa Catalina Mountains, it is the southernmost ski resort in the nation. In summer, Mt. Lemmon attracts hikers to its cool elevations. Spreading out from the Santa Cruz River Valley, Tucson's landscape spans cactus-studded deserts, subterranean habitat and, at times, snow-capped mountains. Most of the bike shops in town rent mountain bikes, including for groups. If sightseeing is a favorite activity, then hot air balloons are a favored mode of transportation. Companies offer a 60 to 90 minute journey, combining low-level views of the beautiful desert landscape, javelina, deer, and red-tailed hawks with spectacular panoramas from higher elevations. For those preferring to stay on the ground, horses and Jeeps carry passengers throughout the desert and foothills.

Visited by well over a million tourists a year, lush **Sabino Canyon**, the largest of the canyons that drain the Catalina Mountains on the north side of Tucson, offers an excellent combination tour and hike. Starting from the parking area, trams carry passengers uphill on a winding 4.5-mile road that crisscrosses Sabino Creek, narrating the trip on the way. Many people disembark at the top and hike back, wading through the seasonally running creek and examining the vegetation and wildlife close up. Closed to private vehicles, the recreation area provides a glimpse of desert beauty.

For an even closer look at the native flora and fauna, visit the **Arizona-Sonora Desert Museum** on the west side of town. Museum workers have built natural-looking enclosures for housing, trying to emulate the native conditions these animals might find in the desert. Mountain lions, bighorn sheep, bears and prairie dogs are some of the desert denizens found here. **Tucson Botanical Gardens** is another excellent display of desert habitat. To the north, **Tohono Chul Park** is a 48-acre oasis featuring many indigenous plants, as well as a selection of plants that were farmed by the prehistoric residents or that were introduced by the Spanish and American settlers.



Established in 1937, the **Amerind Foundation and Art Gallery** is a non-profit research institution devoted to the study, preservation, and interpretation of prehistoric and historic Native American cultures. Housed in beautiful Spanish Colonial Revival style buildings, the Amerind Museum contains one of the finest collections of Indian artifacts in the world.

Located on the east side of Tucson is **Colossal Cave Mountain Park**. This interesting, crystal-filled cave has been used for over a thousand years by Native Americans. Walk and scramble through the cave by electric light or candlelight, or take horseback rides around the 2,000-acre park, visiting the historic La Posta Quemada Ranch. At least 11 species of bats call the cave home.

Tucson is a hotbed of astronomical activity, with **Kitt Peak National Observatory**, just over an hour's drive southwest of Tucson, is the showpiece. An 18-story-high observatory and the world's largest solar telescope are just some of the toys maintained here. Tours are given both night and day, but the nighttime viewing is restricted and only by reservation. The **Whipple Observatory** on Mt. Hopkins, south of Tucson, is operated by the Smithsonian Institution. The world's fourth largest multiple-mirror telescope, located on the summit, is a joint project with the University of Arizona. The U of A's on-campus **Flandrau Science Center and Planetarium** houses another 16-inch telescope in an outdoor observatory, as well as hands-on exhibits.

Space exploration is also the theme of several museums in and around Tucson. The **Pima Air & Space Museum**, with its abundant meeting space and huge collection of aircraft both indoors and out, offers self-guided and group tours, both to the Museum and to **Davis-Monthan Air Force Base**. The **Titan Missile Museum** south of town preserves the only Titan II missile left intact, still in its silo and relegated to history. Combination tickets are available for all three tours.

Other historic buildings and museums abound in Tucson. The most visited is the "White Dove of the Desert," the **Mission San Xavier del Bac**. Built by Tohono O'odham Indians under the direction of Spanish priests, the mission was started in 1700. A \$2 million restoration was completed in 1997 resulting in an unbelievably beautiful and ornate edifice, a must-see on any Tucson visit. The chapel is still used for Mass, and votive candles still flicker in silent vigil.

Downtown Tucson boasts many historic buildings, from the old houses of the **Presidio District** to the colorful Barrio houses, some of which have been converted into office buildings. Archaeologists have uncovered artifacts in the downtown area dating back 4000 years, and current renovations are underway. The Fox Theater, an art deco movie house, underwent extensive renovations in 2004.

Even further back in time, before the Spanish explorers, prehistoric residents left their art on rock canvases. The petroglyphs they chiseled can be seen today in places like Signal Hill at **Saguaro National Park**. Today's Tucson carries on these artistic traditions. Hundreds of outdoor murals grace buildings throughout the city, one of them on the entrance wall at the **Tucson**

Museum of Art.

Around 150 art galleries make their home in Tucson, many near the downtown **Arts District**. Established in 1986, the District includes artists' studios and cafés, some of which sell paintings along with a steaming cup of coffee. The Tucson Arts District Partnership sponsors Thursday night ArtWalks from September through May that include a number of these showrooms and the historic **Temple of Music and Art**. Venues for the performing arts also abound. A number of dance and theater groups offer performances year-round, both indoors and out. Some of the more notable are the **Tucson Pops and Symphony Orchestras**, **Arizona Opera Company**, **Ballet Folklorico Arizona** and **Arizona Theater Company**. The Tucson Gem, Mineral and Fossil Showcase is the world's largest gathering of gem show exhibitors and buyers, and the shows are held annually in January and February.

Shopping

Finding a memento of the trip to Tucson is also an exciting adventure for travelers. Serious shoppers will delight in the broad inventory of practical and whimsical gift items to be found at many homegrown specialty shops and major national retailers. Numerous smaller shopping opportunities are scattered in and around town, offering an inventory of things Southwestern from museum-quality Native American textiles and jewelry to Mexican folk crafts and cowboy memorabilia. On a larger scale, explore five major malls featuring hundreds of well-known stores and restaurants.

Southern Arizona

Replete with natural wonders, history and culture, Southern Arizona has been romancing visitors with its Old West charm for decades. The region's most populous city is Tucson, thriving with plush golf courses and resorts, flourishing art scenes and historical heritage. With Old West towns and guest ranches, the region is a perfect Arizona getaway for visitors who want to relive the past. Or, for those with an eye to the future, the region is also host to astronomy centers and the futuristic experiment of Biosphere 2. A number of Southern Arizona's rich riparian areas and rugged mountain ranges are also ranked as some of the world's best birding sites.

Venturing south of Tucson, visitors can go back in time, underground or into another country—all within a two-hour drive from "the Old Pueblo". Comprising Cochise and Santa Cruz counties, southern Arizona offers artist colonies, golf resorts, authentic 19th-century mining and Old West towns including Tubac, Nogales, Patagonia, Sonoita, Elgin, Benson, Safford, Willcox, Sierra Vista, Douglas, Tombstone, and Bisbee, and prime birding spots that draw more hummingbirds, cranes and other species than just about anywhere in North America. All this plus stunning geologic formations at Chiricahua National Monument and Kartchner Caverns State Park make the region renowned for a wealth of sightseeing options and entertaining experiences.

Spain and Mexico's cultural influences in southern Arizona are abundantly evident in places like Tubac, which was established in 1752 as a Spanish presidio, or fort. Today, artists are a more likely sight in this town than a military garrison would be. Some 80 unique shops and galleries populate the village, many offering handmade crafts, original works of art and exquisite imports. The annual festival in February brings artists from across the country. Its historic roots remain, though, preserved at the Tubac Presidio State Historic Park, where the award-winning volunteers, "Los Tubaqueños," demonstrate life as it was in 18th-century Arizona.

Visitors to Tucson are only a few hours away from the fascinating history of Southern Arizona in which lies in the mystique of the Wild West. Much of the story was written in the mining towns and ranches of the Arizona frontier. Of the rough-and-tumble towns that sprang up during the rush for mineral wealth after Arizona was proclaimed a territory, **Tombstone** was by far the most notorious. Once considerably larger than Tucson, Tombstone is quiet these days, but visitors can watch replays of the gunfights that used to break out along Allen Street. The best known of them took place at the OK Corral, now a popular tourist attraction, as is Boot Hill, the town's once-busy boneyard. **Bisbee**, another Old West town, has traded the rough-and-tumble of Brewery Gulch for the elegance of the arts. Though they still take underground tours of the Queen Mine, most visitors come to browse the galleries and collections that are housed in the historic buildings. **Sierra Vista**, a growing meeting destination in its own right, has an Old West past, also, being located next to historic Ft. Huachuca. Built in 1877 to aid in the Indian Wars, Ft. Huachuca's original Victorian-style officer's quarters are still in use. A museum showcases military paraphernalia, and the Buffalo Soldier's Memorial—a tribute to African-American soldiers who fought on the frontier—was established here also. Sierra Vista is better known these days as "The Hummingbird Capital of the U.S." owing to its location near the Huachuca Mountains. Ramsey Canyon Preserve, owned and operated by The Nature Conservancy, attracts birders from all over the world. To the east, the San Pedro Riparian National Conservation Area protects over 36 miles of the San Pedro River and is home to more than 350 species of birds.

Kartchner Caverns State Park in Benson is the new star of the Southwest, an hour's drive from Tucson. This limestone cave opened as a state park in November 1999 and is the only living cave in the world open to visitors. New for 2004, the "Big Room" is now open, adding 225 additional tours each day.

Just to the northwest, **Patagonia** and **Elgin** are the center of a burgeoning wine-making region. The limestone terrain is ideal for growing grapes, and many compare it to France. Now a thriving artists' community, the unique community of **Tubac** offers over 100 shops, studios and galleries. It is known for "Where Art and History Meet." The **Tubac Center of the Arts** is a place for showcasing and encouraging the arts. The center includes an exhibit space, a performance stage, gift shop, art library and Members' Gallery. As for history, **Tubac Presidio State Historic Park** is the site of the remains of a Spanish fort, and exhibits displays of early frontier life. **Tumacacori National Historic Park** preserves a mission established by Spanish priests.

Interstate 19 from Tucson to Nogales, Mexico is the only one of its kind in the United States—it is signed in metric owing



2022 Winter Conference on Plasma Spectrochemistry

Tucson, Arizona, January 17 – 22, 2022

HOTEL RESERVATION FORM



El Conquistador Tucson, a Hilton Resort

10000 North Oracle Road, Tucson, AZ 85704

PLEASE RETURN THIS FORM BY MAIL/FAX/EMAIL TO:

**M&E Meeting Planners, %Steve Lepow, 52 Warwick St., Longmeadow, MA 01106 USA
Telephone 860-885-4556, FAX 413-324-2990, E-mail memeeetingplanners@gmail.com**

ARRIVAL DATE _____ (Month/Day/Year) CHECKOUT DATE _____

The El Conquistador Tucson Resort conference room rate is \$145.00 per night (single, double occupancy) plus 14.55% tax (\$21.10) for a total of **\$166.10**. Triple room rates are \$25 per night additional. (A rollaway bed is an additional \$20 per night). Children under 18 years old stay free in their parent's room as long as beds do not need to be added. Depending on availability room rates are guaranteed for reservations received by December 20, 2021.

**CONFERENCE RATE CANNOT BE GUARANTEED FOR RESERVATIONS RECEIVED AFTER
DECEMBER 20, 2021.**

PLEASE PRINT CLEARLY AND COMPLETE ONE (1) RESERVATION FORM PER ROOM

ATTENDEE NAME: _____

COMPANY NAME: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP/POSTAL:** _____ **COUNTRY:** _____

WORK PHONE: _____ **CELL:** _____

FAX: _____ **EMAIL:** _____

SHARING WITH: _____

KING BED OR 2 QUEENS? _____

SPECIAL ROOM NEEDS (HANDICAPPED/OTHER): _____

TOTAL DEPOSIT AMOUNT*: _____

CREDIT CARD TYPE (VISA, MASTERCARD, AMERICAN EXPRESS, DISCOVER, DINERS): _____

CREDIT CARD NUMBER: _____ **EXPIRATION DATE:** _____

NAME ON CREDIT CARD: _____ **SECURITY CODE:** _____

CARD HOLDER'S BILLING ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP/POSTAL:** _____ **COUNTRY:** _____

SIGNATURE: _____ **DATE:** _____

*Reservations will not be processed without a signature. Guests must have a credit card available at check in. The credit card will not be charged by the hotel until the end of the stay. No charges will be processed in advance. Guests who fail to arrive on the scheduled arrival date will be considered "No-Shows". Any reservation not cancelled 10 days before arrival date, as well as "No-Shows", will be subject to a one-night room (and tax) cancellation fee. Reservation changes or cancellations must be submitted in writing (by email) to memeeetingplanners@gmail.com, and they must be received ten (10) days before arrival. For airport shuttle from/to TUS and the hotel, please contact memeeetingplanners@gmail.com.

El Conquistador Tucson, A Hilton Resort

Rates

The special conference room rate (single or double) is \$145.00 plus room tax (14.55%). Additional charge for a third person in the same room is \$25 per person, per night (plus tax), or a rollaway bed charge is \$20 per night (plus tax). Children under 18 may stay for free in their parent's room using existing bedding.

Conference guests are provided complimentary access to Elements Fitness Center (equivalent to \$10 per person, per day).

Taxes and Service Charges

Currently, Resort rooms are taxed at a rate of 14.55%. All other resort purchases may be subject to sales tax. Please note that these taxes are subject to change under Arizona State tax laws.

Check-In/Out Time

The check-in time is 4:00 pm; check-out time is 11:00 am. All guests arriving before 4:00 pm will be accommodated as rooms become available. The Bell Staff can arrange to check baggage for those arriving early when rooms are unavailable and for guests attending functions on departure day.

Early Departure Fee

In the event a guest who has requested a room checks out before the guest's reserved checkout date, the Hotel will add an early checkout fee of \$50.00 to the guest's individual account. Guests wishing to avoid an early checkout fee should advise the **Hotel** at or before check-in of any change in planned length of stay. The Hotel will inform attendees of this potential charge at check-in.

Gratuities (Optional)

The following gratuities are suggested and will be at the individual guest's discretion:

- * Portage: \$5.00 in and \$5.00 out per person
- * Maid Services: \$5.00 per room per night

Resort Value Pack (Optional)

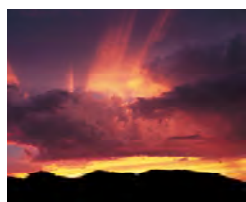
All of the following amenities and services are available at \$10.00 per room, per night, plus applicable tax, and will be offered as an option to purchase by guests upon check in.

- ◆ Wellness Center Admittance (\$10.00 value per day)
- ◆ Country Club Fitness Center Access (\$10.00 value per day)
- ◆ 10% off Tennis/Golf Pro Shop merchandise purchase
- ◆ Half off Tennis Court Fee (Without value pack \$20.00 per hour)
- ◆ Rent one demo racquet and get a second rental free (\$4.50 value)
- ◆ \$5.00 off overnight Valet parking (Without value pack \$11.00 per night)

Resort Parking (Optional)

Self-parking is available without charge. Valet parking is available for a service fee.





2022 Winter Conference on Plasma Spectrochemistry

Tucson, Arizona, January 17 – 22, 2022



CONFERENCE REGISTRATION FEE SUMMARY

Conference Registration Fees	Before — October 22, 2021 —	After	After December 17, 2021
Conference*	\$550	\$850	\$1100
Exhibitor**	\$130	\$425	\$730
Student***	\$ 75	\$130	\$290
Postdoctoral***	\$100	\$260	\$480
Single Day*** (2 days max) @ per day	\$210/day	\$365/day	\$480/day
Short Course Enrollment (each course)	\$120	\$240	\$365
Student Short Course Rate	\$25	\$30	\$50
Conference Dinner (includes taxes and gratuity), Thursday, January 20, 2022			
Conference Dinner (adult)	\$ 65	\$ 69	\$ 73
Conference Dinner (child under 12)	\$ 32	\$ 33	\$ 35

Additional or Duplicate, Shirt, Abstracts

Souvenir T Shirt (Size ____)	\$ 18	\$ 20	\$ 23
Conference Abstracts (duplicate)	\$ 24	\$ 36	\$ 60

* Conference registration includes Conference abstracts, souvenirs and tee shirt, and one-year subscription to *ICP Information Newsletter*. Conference dinner is not included in the registration fee.

** Conference registration for personnel of organizations participating in Conference exhibition and includes Conference abstracts and souvenir shirt only. Exhibitors must be registered as employees of an exhibiting firm. Conference dinner is not included in the Exhibitor registration fee.

*** Conference registration includes Conference abstracts and souvenir shirt only. Only full-time students are eligible for student registration. Enclose a letter signed by the academic advisor.

No registration fees are charged for accompanying persons, family, or children.

CANCELLATION POLICY: Full refund available if written request postmarked before December 17, 2021; 50% refund if request postmarked no later than December 24, 2021. No refund for requests postmarked after December 24, except for medical reasons with doctor's verification.

New subscriptions to the *ICP Information Newsletter* for 2021 and 2022 are available at a special 10% discount [\$60.30 (US, Canada), \$82.80 (Europe, South America), \$91.80 (Asia, Pacific, etc.)].

Tax-deductible contributions are solicited to our Conference Travel and Registration Grant funds for students and overseas visitors. Do not overlook your corporate gift matching programs.

Please send payment with Registration form to **WINTER CONFERENCE**, %Ramon Barnes, ICP Information Newsletter, Inc., 18241 Beauty Berry Ct, Lehigh Acres, FL 33972-7525 USA.

Federal Employer Identification Number (EIN) is 04-3361420.

American Express, MasterCard, or Visa may be employed to pay for your registration. Please enclose the following information with your registration form:

Paid by: ☐ Check or money order; ☐ American Express; ☐ Master Card; ☐ VISA

Cardholder's Name (as printed on card) : _____

Credit Card Account No. (All digits) _____ Expiration date _____ Security Code _____

Card Holder's Billing Address: _____

Cardholder Signature: _____ Date _____

2022 Winter Conference on Plasma Spectrochemistry, %ICP Information Newsletter, Inc.,
18241 Beauty Berry Ct., Lehigh Acres, FL 33972-7525; P.O. Box 666, Hadley, MA 01035-0666 USA
Dr. Ramon Barnes, Conference Chairman, Telephone (239) 674-9430, Fax (239) 674-9431
email wc2022@chem.umass.edu, http://icpinformation.org



2022 Winter Conference on Plasma Spectrochemistry Tucson, Arizona, January 17 – 22, 2022



CONFERENCE REGISTRATION

A. Registration

Please Type or Print Clearly

FAMILY NAME

FIRST NAME

COMPANY

ADDRESS

CITY

STATE

ZIP/POSTAL CODE

COUNTRY

E-MAIL

Telephone (Business)

(Cell)

FAX

Please indicate:

☐ Author ☐ Co-author ☐ Attending (☐ Single day ☐ Short Course Only) ☐ Exhibitor ☐ Student* (☐ Predoctoral ☐ Postdoctoral)

*Only full-time students are eligible for student registration. Academic advisor must countersign registration.

Tee Shirt Size: ☐ Extra Extra Large ☐ Extra Large ☐ Large ☐ Medium ☐ Small ☐ Lady's sizes

B. Accompanying Person(s), Transportation, Accommodations (Information purposes only)

Give names of accompanying person: Spouse or

Children (Names/Ages)

Other

Arrival Date/Time

Airline

Departure Date

Hotel: ☐ Hilton Tucson El Conquistador ☐ Other

C. Conference Registration Fees

Before

After

After

Enter Amount

Subtotal

October 22, 2021

December 17, 2021

<input type="checkbox"/> Conference	\$550	\$850	\$1100	\$_____	
<input type="checkbox"/> Exhibitor	\$130	\$425	\$730	\$_____	
<input type="checkbox"/> Student	\$ 75	\$130	\$290	\$_____	
<input type="checkbox"/> Postdoctoral	\$100	\$260	\$480	\$_____	
<input type="checkbox"/> Single Day ___ days (2 days max) @	\$210	\$365	\$480 per day	\$_____	\$_____
D. Short Course Enrollment (each)	\$120	\$240	\$365 [indicate below]		
<input type="checkbox"/> Student* Short Course	\$25	\$30	\$50 [indicate below]		

Mark Date, Time Fill-in Course Number (SX- 00) and Name

<input type="checkbox"/> (1) Friday, Jan 14, 1 pm	S__ -		\$_____	
<input type="checkbox"/> (2) Friday, Jan 14, 7 pm	S__ -		\$_____	
<input type="checkbox"/> (3) Saturday, Jan 15, 8 am	S__ -		\$_____	
<input type="checkbox"/> (4) Saturday, Jan 15, 1 pm	S__ -		\$_____	
<input type="checkbox"/> (5) Saturday, Jan 15, 7 pm	S__ -		\$_____	
<input type="checkbox"/> (6) Sunday, Jan 16, 8 am	S__ -		\$_____	
<input type="checkbox"/> (7) Sunday, Jan 16, 1 pm	S__ -		\$_____	
<input type="checkbox"/> (8) Sunday, Jan 16, 7 pm	S__ -		\$_____	
<input type="checkbox"/> (9) Monday, Jan 17, 7 pm	S__ -		\$_____	
<input type="checkbox"/> (10) Tuesday, Jan 18, 7 pm	S__ -		\$_____	\$_____

E. Conference Dinner (includes tax and gratuity)

Number Ordered

<input type="checkbox"/> Conference Dinner (adult)	\$65	\$69	\$73 (x__)	\$_____	
<input type="checkbox"/> Conference Dinner (child under 12)	\$32	\$33	\$35 (x__)	\$_____	\$_____

F. Duplicate/Additional Shirts, Abstracts, Donations

Number Ordered

<input type="checkbox"/> Souvenir T Shirt (Size __)	\$18	\$20	\$23 (x__)	\$_____	
<input type="checkbox"/> Conference Abstracts (duplicate)	\$24	\$36	\$60 (x__)	\$_____	\$_____
<input type="checkbox"/> Subscription to ICP Information Newsletter (January - December 2022)				\$_____	\$_____
<input type="checkbox"/> Tax-Deductible Contribution to Conference Travel-Registration Funds				\$_____	\$_____

TOTAL \$ _____

Please send payment with this Registration form to **WINTER CONFERENCE**, %Dr. Ramon Barnes, ICP Information Newsletter, Inc., 18241 Beauty Berry Ct, Lehigh Acres, FL 33972-7525, or wc2022@chem.umass.edu.

Paid by: ☐ Check or money order ☐ American Express ☐ Master Card ☐ VISA. Cardholder Name: _____

Credit Card Account No. _____ Expiration Date _____ Security Code _____

Card Holder's Billing Address _____

Signature: _____

Date: _____

For Conference Use Only

REGISTRATION NUMBER 2022-____-____-____-____

Payment: \$

Check No.

Date Received:

Refund:

Check Date

Acknowledgment:



2022 Winter Conference on Plasma Spectrochemistry Tucson, Arizona, January 17 – 22, 2022



CONFERENCE REGISTRATION – Early Bird Special- July 23, 2021

A. Registration Please Type or Print Clearly

FAMILY NAME

FIRST NAME

COMPANY

ADDRESS

CITY

STATE

ZIP/POSTAL CODE

COUNTRY

E-MAIL

Telephone (Business)

(Mobil)

FAX

Please indicate:

☐ Author ☐ Coauthor ☐ Attending (☐ Single day ☐ Short Course Only) ☐ Exhibitor ☐ Student* (☐ Predoctoral ☐ Postdoctoral)

*Only full-time students are eligible for student registration. Academic advisor must countersign registration.

Tee Shirt Size: ☐ Extra Extra Large ☐ Extra Large ☐ Large ☐ Medium ☐ Small ☐ Lady's Size.

B. Accompanying Person(s), Transportation, Accommodations (Information purposes only)

Give names of accompanying person: Spouse or

Children (Names/Ages)

Arrival Date/Time

Departure Date

Other

Airline

Hotel: ☐ Hilton Tucson El Conquistador ☐ Other

C. Conference Registration Fees Only Before July 23, 2021

Enter Amount Subtotal

<input type="checkbox"/> Conference	\$510	\$	_____	
<input type="checkbox"/> Exhibitor	\$125	\$	_____	
<input type="checkbox"/> Student	\$ 70	\$	_____	
<input type="checkbox"/> Postdoctoral	\$ 92	\$	_____	
<input type="checkbox"/> Single Day ___ days (2 days max) @ \$175 per day		\$	_____	\$

\$ _____

D. Short Course Enrollment (each) \$100 [indicate below]

☐ Student* Short Course \$25 [indicate below]

Mark Date, Time Indicate Course Number (SX - 00) and Name

<input type="checkbox"/> (1) Friday, Jan 14, 1 pm	S__ -	\$	_____	
<input type="checkbox"/> (2) Friday, Jan 14, 7 pm	S__ -	\$	_____	
<input type="checkbox"/> (3) Saturday, Jan 15, 8 am	S__ -	\$	_____	
<input type="checkbox"/> (4) Saturday, Jan 15, 1 pm	S__ -	\$	_____	
<input type="checkbox"/> (5) Saturday, Jan 15, 7 pm	S__ -	\$	_____	
<input type="checkbox"/> (6) Sunday, Jan 16, 8 am	S__ -	\$	_____	
<input type="checkbox"/> (7) Sunday, Jan 16, 1 pm	S__ -	\$	_____	
<input type="checkbox"/> (8) Sunday, Jan 16, 7 pm	S__ -	\$	_____	
<input type="checkbox"/> (9) Monday, Jan 17, 7 pm	S__ -	\$	_____	
<input type="checkbox"/> (10) Tuesday, Jan 18, 7 pm	S__ -	\$	_____	\$

E. Conference Dinner (includes tax and gratuity)

☐ Conference Dinner (adult) \$65

☐ Conference Dinner (child under 12) \$32

Number Ordered

(x___) \$ _____

(x___) \$ _____

F. Duplicate/Additional Shirts, Abstracts, Donations

☐ Souvenir T Shirt (Size ___) \$15

☐ Conference Abstracts (duplicate) \$21

Number Ordered

(x___) \$ _____

(x___) \$ _____

☐ Subscription to *ICP Information Newsletter* (January - December 2022) \$ _____ \$ _____

☐ Tax-Deductible Contribution to Conference Travel-Registration Grant Funds \$ _____ \$ _____

TOTAL \$ _____

Please send payment with this Registration form to **WINTER CONFERENCE**, %Dr. Ramon Barnes, ICP Information Newsletter, Inc., 18241 Beauty Berry Ct, Lehigh Acres, FL 33972-7525, or wc2022@chem.umass.edu.

Paid by: ☐ Check or money order ☐ American Express ☐ MasterCard ☐ VISA. Cardholder Name: _____

Credit Card Account No. _____ Expiration Date _____ Security Code _____

Card Holder's Billing Address _____

Signature: _____

Date: _____

For Conference Use Only

REGISTRATION NUMBER 2022-____-____-____-____-____-____-____-____-____-____

Payment: \$ _____ Check No. _____

Date Received: _____

Refund: _____ Check Date _____

Acknowledgment: _____

2022 Winter Conference on Plasma Spectrochemistry

Call for Abstracts and Titles

Preliminary titles and abstracts (50 words) are solicited on original plasma spectrochemical research, methods and applications. A submission form is available on page 19. The title and abstract submission deadline is July 23, 2021. Accepted titles will be acknowledged in August and assigned program times, and final abstracts will be due October 22, 2021. An abstract processing fee (\$50) will be waived for on-time submissions, and a post-deadline processing fee penalty will be added for late submissions. Symposium topics include the following, and papers covering other plasma-related topics are encouraged:

Symposia on Trace Elements, Stable Isotope, and Elemental Speciation Analyses

- Biological Imaging and Speciation Analyses
- Certified Reference Materials, Quality Control, Metrology
- Chemicals, Pure Reagents, Ultrapure Water
- Clinical Biomonitoring, Imaging, and Mass Cytometry
- Earth, Marine, and Geological Sciences
- Environmental, Agricultural, and Food Sciences
- Fundamental Processes, Basic Studies
- Petroleum Materials, Products, and Organic Solvents
- Pharmaceutical, Supplements, Nutraceutical Analysis
- Plasma Instrumentation, Sample Presentation
- Provenance, Authentication, Source Origin, Forensics
- Radioisotopes and Nuclear Materials Analyses
- Semiconductor Materials Analyses
- Solids, Surfaces, Interfaces, and Nanomaterials

Symposium Topics

- Elemental speciation and speciation sample preparation
- Excitation mechanisms and plasma phenomena
- Flow injection and fractionation spectrochemical analysis
- Glow discharge atomic and mass spectrometry
- Inductively coupled plasma atomic and mass spectrometry
- Laser ablation and induced breakdown spectrometry
- Microwave atomic and mass spectrometry
- Micronebulization systems, microplasma systems
- Plasma chromatographic detectors, combined systems
- Plasma instrumentation, automation, detectors, spectrometers, and software innovations
- Sample introduction, transport phenomena, and modeling
- Sample preparation, treatment, and automation; high-purity materials, and quality assurance
- Spectrochemical chemometrics, and expert systems
- Spectroscopic standards, reference materials, and data bases
- Stable isotope analyses and applications

Abstracts and titles for the Workshop on New Plasma Instrumentation (Tuesday, January 18) from manufacturers and vendors also will be accepted with the same guidelines as conference presentations. A \$250 registration fee is required for Workshop speakers.

Program Outline Example

Monday, January 17, 2022

- 8:00 Opening and Welcome
1. Sample Introduction and Transport Phenomena
 8:05 (PL1) Plenary Lecture
 9:00 (IL1) Invited Lecture
 9:30 (IL2) Invited Lecture
2. Nanomaterial Analysis and Characterization
 1:00 (IL3) Invited Lecture
 1:30 (IL4) Invited Lecture
 5:30 (HL1) Heritage Lecture
 6:30 Exhibition Opening and Social Mixer

Tuesday, January 18, 2022

- 3. Laser Assisted Plasma Spectrochemistry**
 8:00 (PL2) Plenary Lecture
 9:00 (IL5) Invited Lecture
 9:30 (IL6) Invited Lecture
4. Laser-Induced Breakdown Spectroscopy
 1:00 (IL7) Invited Lecture
 1:30 (IL8) Invited Lecture
 3 - 6:30 Poster Session
 3:15 - 5:15 (WS1) Workshop New Plasma Instrumentation
 5:30 (HL2) Heritage Lecture
 6:30 Social Mixer

Wednesday, January 19, 2022

- 5. Fundamentals, Instrumentation, and Mechanisms**
 8:00 (PL3) Plenary Lecture
 9:00 (IL9) Invited Lecture
 9:30 (IL10) Invited Lecture
6. Novel Plasma Instrumentation, Advanced Plasma Detectors, and Microplasma Systems
 1:00 (IL11) Invited Lecture
 1:30 (IL12) Invited Lecture
 3 - 6:30 Poster Session
 3:15 - 5:15 (WS2) Workshop Speciation Methodology
 5:30 (HL3) Heritage Lecture
 6:30 Social Mixer

Thursday, January 20, 2022

- 7. Elemental Speciation, Metallomics**
 8:00 (PL4) Plenary Lecture
 9:00 (IL13) Invited Lecture
 9:30 (IL14) Invited Lecture
8. Imaging Plasma Mass Spectrometry and Biodistribution Analysis
 1:00 (IL15) Invited Lecture

1:30 (IL16) *Invited Lecture*
3 - 6:30 *Poster Session*
3:15 - 5:15 (WS3) *Workshop Biological, Clinical Analysis*
5:30 (HL4) *Heritage Lecture*
7:00 *Conference Dinner*

Friday, January 21, 2022

9. Atmospheric, Environmental, Bioecological Sciences

8:00 (PL5) *Plenary Lecture*
9:00 (IL17) *Invited Lecture*
9:30 (IL18) *Invited Lecture*

10. Stable Isotope and Forensics Analyses

1:00 (IL19) *Invited Lecture*
1:30 (IL20) *Invited Lecture*
3 - 6:30 *Poster Session*
3:15 - 5:15 (WS4) *Workshop Stable Isotope Methodology*
5:30 (HL5) *Heritage Lecture*
6:30 *Social Mixer*

Saturday, January 22, 2022

11. Earth, Marine, and Geological Sciences

8:00 (PL6) *Plenary Lecture*
9:00 (IL21) *Invited Lecture*
9:30 (IL22) *Invited Lecture*

12. Advanced Materials, Surfaces, and Interfaces Petroleum and Semiconductor Materials

1:00 (HL6) *Heritage Lecture*
2:00 (IL23) *Invited Lecture*
2:30 (IL24) *Invited Lecture*
6:30 *Conference Closing*

Conference Travel and Registration Grants

The Winter Conference sponsor, the ICP Information Newsletter Inc., is a tax-exempt philanthropic organization that will offer Conference Travel and Registration Grants to students and international scientists, who wish to present recent research results at the 2022 Winter Conference. This grant program is supported by fund raising and donations from individuals and corporate sponsors, and no Conference registration fees are used. Tax-deductible gifts for these grants are solicited, and donations can be made with registration (see Registration form) or directly at any time. Travel and Registration Grant rules and application forms can be obtained from the Conference chairman.

Book Travel and Hotel Early

Tucson is a very popular Winter holiday destination, and airline flights, hotels and other reservations often are booked well in advance. We recommend that you make your hotel, travel, and conference arrangements as early as possible to take advantage of early bird rates. For assistance with hotel arrangements at El Conquistador Tucson, contact Mr. Steve Lepow at memeetingplanners@gmail.com. He also has obtained conference discounts for airport shuttles.

Heritage Lectures

Six Heritage Lectures will be presented by distinguished scientists and investigators, who have contributed significantly to the development of plasma spectrochemistry and will address critical development areas in sample introduction, instrumentation, elemental speciation, plasma source mass spectrometry, and novel software and hardware.

The Heritage Lecture series was initiated at the 2010 Winter Conference, and the following Heritage lectures have been presented:

2020 Winter Conference

Being Lucky, Gary M. Hieftje, Indiana University
Mirabile Dietu: Isotope Measurements as a Truth Serum, Michael Ketterer, Northern Arizona University
From Pyramids to Plasma - The Heritage of Analytical Chemistry in Africa, Rob McCrindle, Tshwane University, South Africa
Open Box Before Eating Pizza - A Relevant Perspective, Richard E. Russo, Lawrence Berkeley National Laboratory
From There to Here to Another (There and Back Again), Scott D. Tanner, Canada

2018 Winter Conference

Reflections on Decisions Made: Ultratrace Elemental Analysis, Ralph Sturgeon, National Research Council of Canada
Lifelong Learning, Norbert Jakubowski, BAM - Federal Institute for Materials Research, and Testing Division
Science According to Calvin & Hobbes, David Koppenaal, Pacific Northwest National Laboratory
An Academic Life Exploring the Increasing Complexity of Matter with Atomic Spectrometry, Alfredo Sanz-Medel, University of Oviedo
A Journey in the Life of a Practical Atomic Spectroscopist, Isaac (Joe) Brenner, Brenner Scientific

2016 Winter Conference

Tools of the Trade — From Flow Injection to Laser Ablation, Alan G. Cox and Cameron McLeod, University of Sheffield
The Boundary Conditions for Scientific Research, Kay Niemax, Federal Institute for Materials Research and Testing
49 Years of Atomic Spectroscopy — From Nebulizers to Detectors — Time Marches On, M. Bonner Denton, University of Arizona
Innovative Research on Plasma Spectrochemical Methods for Solving Analytical Problems, José A.C. Broekaert, University of Hamburg
ICP-MS From the Eye of a Beholder Part II, Robert S. Houk, Iowa State University

2014 Winter Conference:

Back to the Future, Barry L. Sharp, Loughborough University
Lasers at Work in Atomic Spectroscopy: A Long Flaming and Sparking Combination of Diagnostic and Analytical Aspects, Nicoló Omenetto, University of Florida
High Power or Low Power; Reflections on a Plasma Spectrochemical Controversy and Some Professional Lessons Learnt, Les Ebdon, University of Bedfordshire
Make Big Plans - Aim High in Hope and Work, Michael J. Collins, CEM Corporation
Observations on Commercial Analytical Instrumentation Development, Andrew T. Zander, Torrance, California

Spectroscopic Imaging: A Spatial Odyssey, Freddy Adams, University of Antwerp

2012 Winter Conference:

The Paradigm Change of the Instrumental Revolution, Leo de Galan, Schiedam, The Netherlands

Scientific Research: Creativity and Discovery, Chris Enke, University of New Mexico

Paradigm Shifts in Analytical Plasma Spectrometry, Gary Horlick, University of Alberta

Inductively Coupled Plasma Mass Spectrometry: A Personal Odyssey, Trials, Tribulations, Problems, and Successes, Henry Longerich, Memorial University of Newfoundland

Flow Injection Analysis -- From Beaker to Microfluidics, Jaromir (Jarda) Ruzicka, University of Hawaii, Manoa

Spectrochromatography Elemental Speciation, Retrospect, Perspective and Prospects, Peter C. Uden, University of Massachusetts, Amherst

2010 Winter Conference:

From Academic Research to Real World Problems (and Vice Versa), Jean-Michel Mermet, Tramoyes, France

Over 50 Years of Atomic Spectroscopy, James D. Winefordner, University of Florida, Gainesville

Some Memories of 20 Years Development and Application of ICP Emission Spectrometry, Knut D. Ohls, Erding, Germany

Isotope Ratio Measurements: Highlights, Pitfalls, Frustrations — 40 Years of Experience in the Field, Klaus G. Heumann, Johannes Gutenberg University Mainz

Thirty-Seven Years of Plasma Spectrochemistry at FDA's Elemental Analysis Research/Forensic Chemistry Center, Fred L. Fricke, US Food and Drug Administration

The Glow Discharge: A Splendidly Versatile Source, Willard W. Harrison, University of Florida, Gainesville

Winter Conference Award in Plasma Spectrochemistry

The 2022 Winter Conference Award in Plasma Spectrochemistry, sponsored by Thermo Fisher Scientific, recognizes achievements in conceptualization and development of novel instrumentation as well as the elucidation of fundamental events or processes involved in plasma spectrochemistry. The Award also acknowledges the authorship of significant research papers or books that have had an influential role in new advancements as well as outstanding applications that open new fields of use for plasma spectrochemistry.

At the 2022 Winter Conference two awards will be presented to scientists who have made noteworthy contributions to the field of plasma spectrochemistry as judged by an international selection committee. One award is for a senior scientist, and the second award will be for a young scientist, who will be no older than 45 years at the time the award is announced. Thermo Fisher Scientific invites scientists worldwide to submit their applications for these awards. For information and details, visit www.thermoscientific.com/wpcaward. Documentation can be submitted to wpc.award@thermofisher.com.

Thermo Fisher Scientific will present the awards at the 2020 Winter Conference. In addition to having his/her contributions to the field recognized by the scientific community and the

industry, the selected scientists will also receive a \$5000 prize, a certificate, and trophy during the award ceremony.

The first award was presented during the 2010 Winter Conference. Awardees have included Scott D. Tanner and Gerado Gamez (2020), R. Sam Houk and Jorge Pisonero (2018), Nicoló Omenetto and Steven Ray (2016), Gary M. Hieftje (2014), J. Sabine Becker (2012), and Ramon M. Barnes (2010).

Professional Development Courses

Professional development short courses at introductory and advanced levels and manufacturers' seminars will be offered Friday through Tuesday, January 14 - 18, 2022. Course details, instructors, and times are found on page 23.

These courses and seminars have been developed to meet the needs of today's plasma spectrochemistry professional and to offer creative solutions for solving industry challenges, generating cost savings, and expanding skillsets needed to advance personal and professional knowledge via the latest technology and best practices. Instructors for each course will share their extensive plasma spectrochemistry expertise in a small group setting. Topics include plasma spectrochemistry analyses, instrumentation, techniques and sample introduction and preparation approaches as illustrated below.

Arsenic and Mercury Speciation in Biological Samples
Plasma Spectrochemical Interferences
Clinical ICP-MS Analyses
Contamination Control for Trace Element Analysis
Direct Analysis with Ambient Mass Spectrometry
Elemental Impurities: USP <232> and <233>
Elemental Speciation Analysis and Metallomics
Elemental Testing in Toxicology
Elemental and Isotopic ICP-MS Analysis
Environmental Monitoring ICP-MS-Based Isotopic Methods
Environmental Sampling Techniques
Flow Injection Analysis Techniques
Glow Discharge Atomic and Mass Techniques
High-Resolution ICP-MS
Human Body Fluids and Tissues Analyses
ICP-MS Biodistribution Studies of Nanoparticles
ICP-MS Introduction, Advanced Topics
Interferences Identification and Correction in ICP-MS
Interferences Identification and Correction in ICP-OES
Isotope Dilution ICP-MS of Elemental Traces and Species
Isotopic Analysis for Beginners
Laser Ablation Fundamentals, Applications, and Directions
Laser Ablation ICP Mass Spectrometry
Laser Ablation ICP-MS Isotopic Analysis
Laser-Induced Breakdown Spectroscopy (LIBS)
Matrix Effects in ICP Techniques
Microwave-Assisted Sample Preparation for Spectrochemistry
Nebulizer Diagnostics and Characteristics
Nebulizers for Modern Sample Introduction
Petroleum and Petroleum Products Analyses
Pharmaceutical Applications of Atomic Spectrometry
Plasma Diagnostics: Fundamentals, Measurements
Plasma Source Time-of-Flight Mass Spectrometry
Preparing Your Laboratory for Trace Analyses
Reaction and Collision Cells for ICP-MS
Sample Introduction for ICP Spectrochemistry



2022 Winter Conference on Plasma Spectrochemistry Tucson, Arizona, January 17 – 22, 2022



CONFERENCE PRESENTATION TITLE AND ABSTRACT SUBMISSION FORM

Submission Deadline: July 23, 2021

I (we) plan to submit a paper as a ☐ lecture (15 minutes), ☐ poster, ☐ computer poster, ☐ either.
TITLE

AUTHOR NAME(S) [give full names of all authors, underline presenting author]:

COMPLETE POSTAL AND E-MAIL ADDRESS(ES) [give full address of all authors]:

Please type a 50-word descriptive abstract, sign below, and return this form by July 23, 2021, to 2022 Winter Conference, Attention: R. Barnes, ICP Information Newsletter, 18241 Beauty Berry Ct, Lehigh Acres, FL 33972-7525 or PO Box 666, Hadley, MA 01035-0666; fax (239) 674-9431, e-mail wc2022@chem.umass.edu

CLASSIFICATION. Which of the following best describes your contribution?

A. *Symposium:*

- ☐ Sample introduction/transport phenomenon, ☐ Nanomaterial analysis, ☐ Elemental speciation, ☐ Chromatography and plasma detectors, ☐ Automation, plasma instrumentation, detector systems, ☐ Artificial intelligence, chemometrics, software, ☐ On-line and remote analysis, ☐ Sample preparation, treatment, ☐ Spectroscopic standards and reference materials, ☐ Excitation mechanisms and plasma phenomena, ☐ Laser-assisted plasma spectrochemistry, laser ablation, laser-induced breakdown spectroscopy, ☐ Glow discharge, ☐ Imaging mass spectroscopy, mass cytometry, ☐ Plasma source mass spectrometry, ☐ Stable isotope analysis, forensics, ☐ Quality assurance

B. *Application:*

- ☐ Agriculture/Botany, ☐ Biology, ☐ Chemicals, ☐ Energy, ☐ Environment, ☐ Food, ☐ Geology, ☐ High-purity materials, ☐ Industrial products, ☐ Medicine/Clinical/Forensic, ☐ Metals, ☐ Nanomaterials, ☐ Petroleum, ☐ Semi/superconductor, ☐ Stable isotopes, ☐ Water, ☐ Other _____; ☐ Workshop on New Plasma Instrumentation

PUBLICATION. Which of the following best describes your intentions for publication of the proposed paper?

- ☐ submission to Conference proceeding journal:
☐ *Journal of Analytical Atomic Spectrometry*.
☐ submission to *ICP Information Newsletter*. ☐ submission to another journal. ☐ no plan to submit manuscript.

CERTIFICATION.

I (we) certify that the material to be presented represents original research or development, which at the time of the Conference will previously not have been published or presented in public.

SIGNATURE _____

DATE _____

COMPLETE MAILING ADDRESS (if not included above):

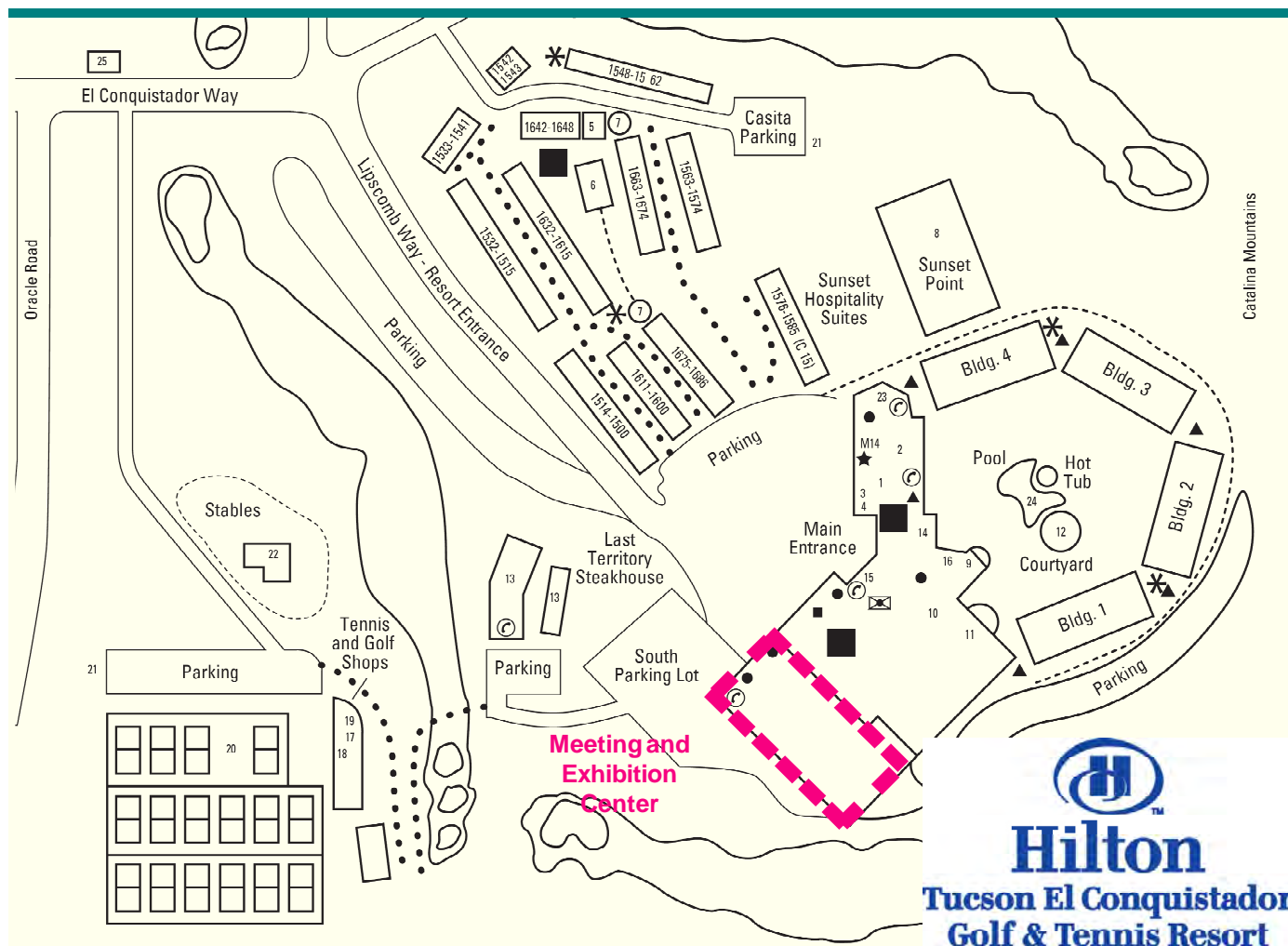
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Paper

Registration 2022-_____-_____-



2022 Winter Conference on Plasma Spectrochemistry

January 17 – 22, 2022, Tucson, Arizona



wc2022@chem.umass.edu

<http://icpinformation.org>

<http://www.hiltonelconquistador.com>,

<http://www.visitTucson.org>



MEETINGS

With over 100,000 sq ft of flexible indoor and outdoor meeting space, the El Conquistador will host the 2020 Winter Conference by offering two 12,000 sq ft ballrooms, one for the exhibition and one for the meeting, as well as spectacular outdoor venues with views of Pusch Ridge.

EXECUTIVE CONFERENCE CENTER

The 11,000 sq ft Executive Conference Center is an exceptional venue for satellite meetings with eight distinct meeting rooms, including a boardroom with a built-in 70" LED television.



CONVENTION CENTER MAP

2022 Winter Conference Exhibition and Posters

Tuesday, January 18 - Thursday, January 20, 2022

Turquoise Ballroom and Foyer

