ORANGE COUNTY SANITATION DISTRICT

HONOR WALL NOMINEE FORM

Please complete this form and return it to the OC San Public Affairs Office.

Name of nominee: Yu-Li Tsai, Ph.D.

Relationship to OC San: Former Senior Scientist, retired March 2021

On a separate sheet, please describe:

- The length and nature of the nominee's relationship to OC San;
- How he or she has enhanced the quality of operations and/or leadership; and
- How the nominee has made an exceptional contribution to OC San or people served by OC San.

Please use the attached leadership competencies and resolution adopted by the Board of Directors establishing the program, as reference.

Nominees should be past Board Members or former employees.

Name of requestor: Joseph Manzella

Phone/email address: x7490, jmanzella@ocsan.gov

Department head approval*: N/A Date: N/A

General manager approval*: Robert Thompson Date: 04/14/2025

Steering Committee approval: ☐ Yes ☐ No Date:

*Required for employee nominations only.

RESOLUTION NO. OCSD 08-08

A RESOLUTION OF THE BOARD OF DIRECTORS OF ORANGE COUNTY SANITATION DISTRICT ESTABLISHING A POLICY FOR NAMING FACILTIES AND THE PLACEMENT OF MONUMENTS AND OTHER MEMORIALS

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WHEREAS, the Orange County Sanitation District wishes to recognize individuals that have provided meaningful and important service to the Sanitation District;

WHEREAS, the District recognizes the need for guidance in the naming of facilities and placing of monuments and other memorials;

NOW THEREFORE, the Board of Directors of the Orange County Sanitation District

DOES HEREBY RESOLVE, DETERMINE AND ORDER:

Section 1: The naming of District facilities or the placement of monuments and other memorials will be a rare event designed to honor an individual who has made distinct and significant contributions to the District.

Section 2: To be recognized by the District, the individual must have demonstrated or performed the following:

- Have a long standing affiliation with and made an exceptional contribution to, the Orange County Sanitation District
- Significantly enhanced the quality of operations and/or leadership directly contributing to the well-being of the District and the people served by OCSD

Section 3: By a majority vote of the Steering Committee, an individual may be recognized by the naming of a component, building, support facility, or through the placement of a plaque, marker, or other memorial.

Section 4: Only new or unnamed facilities will be named in honor of an individual.

PASSED AND ADOPTED at a regular meeting held June 25, 2008.

James M Ferryman
Board Chair

ATTEST:

Clerk of the Board

OC San Leadership Competencies

COMPETENCY	DESCRIPTION
Communication	Ability to communicate ideas, thoughts, and facts both verbally and written. Ability to interpret, comprehend, or understand ideas, thoughts, and facts expressed by others. Conveying information using correct grammar, appropriate body language, proper tone and inflection, recognizing verbal and nonverbal cues, and respecting and listening to the audience to effectively communicate ideas.
Integrity/ Honesty	Degree to which an individual can be trusted. Operates in an ethical manner. Degree of trustworthiness and ethical behavior of an individual with consideration for the knowledge one has of the impact and consequences when making a decision or taking action.
Interpersonal Skills (Working with Others)	Extent to which an individual gets along and interacts positively with co-workers. Degree and style of understanding and relating to others.
Conflict Management	Ability to effectively resolve disputes among others. Manages disagreements. Methods and style of dealing with disagreements. Requires the ability to remain impartial and unbiased.
Team Leadership	Ability to effectively manage and guide group efforts. Includes providing appropriate level of feedback concerning group process.
Teaching Others	Overall concern for the developmental level of an individual or group. Takes steps to explain and provide guidance.
Decisiveness	Degree to which an individual successfully determines, follows, and persists with a timely course of action. Requires the consideration of multiple factors and influences in making decisions.
Planning and Evaluation	The concurrent management of projects, time, self, and other resources including prioritizing, planning, goal setting, and coordinating with respect to goals and objectives. Ability to create and follow a set path in order to achieve a goal. Ability to determine the effectiveness of a given plan.
Problem Solving	The identification of various types of problems along with the creating of workable solutions. Requires the identification and analysis of problems, evaluation of alternatives, and provision of solutions.
Goal & Task Management	The extent to which one plans, prioritizes, sets goals, establishes standards, coordinates tasks, shows concern for deadlines, and tracks progress with respect to personal performance. Includes the ability to perform under pressure and in stressful situations.
Effort & Initiative	Level of concern for own effort and initiative. Refers to effort an employee will display during a particular task. The extent that an individual will work and take action without specific direction and without being monitored. Also refers to the degree that an individual is a self-starter, motivated, and is a risk-taker.

Vision	Understanding of how an organization must change in light of internal and external trends and influences.
Organizational Awareness	Understanding of the formal and informal structures within an organization, and the ability to operate effectively within them.
Career Specific Expertise	Extent to which an individual possesses and applies job-related knowledge in the completion of work tasks and activities. Includes knowledge gained through formal and informal education or training.

Honor Wall Nomination

Yu-Li Tsai, Ph.D. – Senior Scientist, Division 630

Dr. Yu-Li Tsai spent nearly 30 years at OC San as a technical expert, team leader, teacher, mentor, and public servant. His distinct and significant contributions to OC San more than justify his inclusion on OC San's Honor Wall.

While it is impossible to adequately summarize an accomplished 30-year career in just a few pages, two distinct contributions with significant long-term effects on OC San stand out:

- Dr. Tsai is a renowned expert in his scientific discipline, who pioneered efforts to develop and implement innovative lab testing at OC San, and who accumulated over 75 peer-reviewed publications throughout his career, a distinct accomplishment which highlights his depth of knowledge and expertise.

- Yu-Li's vision, leadership, persistence, teaching, and mentoring was instrumental to OC San's laboratory achieving national accreditation. OC San was recognized by California's Environmental Laboratory Accreditation Program (CA ELAP) as an early adopter of the TNI Standard and was honored by CWEA as the first municipal laboratory in California to achieve National Environmental Laboratory Accreditation Program (NELAP) accreditation in 2017, several years ahead of most California municipal labs. This significant accomplishment demonstrates OC San's leadership in the wastewater industry, and it would not have been possible without Dr. Tsai.

The following walk down memory lane elaborates on Yu-Li's many contributions to OC San, many of which will have lasting impacts for decades to come.

"Dr. Yu-Li", as he was affectionately known throughout the lab, began his OC San career in December of 1991. He was hired as a Principal Laboratory Analyst whose primary responsibility was research and development of molecular methods for detecting viruses in wastewater such as PCR (polymerase chain reaction). Since the COVID-19 pandemic, technologies like PCR have practically become household terms, but in 1991, the work that Yu-Li was doing was on the cutting edge of wastewater science; in fact, the invention of the technology of PCR was awarded the Nobel prize in 1993. Yu-Li's Ph.D. in Microbiology from Ohio State University and post-doctoral experience at the University of Connecticut and University of California, Irvine (UCI), gave him the career-specific expertise necessary to help OC San explore this emerging technology. In recognition of his technical leadership and the level of effort and initiative he displayed right out of the gate, he was promoted to the classification of Scientist within a year after being hired. His four years of work in the

molecular biology laboratory led to twelve publications describing new methods for detecting a variety of viruses and other pathogens in wastewater and ocean water. Over his entire career, Yu-Li published over 75 scientific papers, abstracts, and book chapters.

In 1995, Yu-Li was reassigned to the General Chemistry team within the laboratory, where he served as a technical expert, quality assurance lead, and chief problem-solver. In his 15 years with the team, Yu-Li was involved in a variety of studies related to Water Factory 21 and the lead-up to GWRS. He also led efforts to modernize the laboratory's methods and workflows. One example of such an effort was leading the switch from an inefficient, manual method for oil and grease extraction to a modern, automated method which cut costs, reduced waste, and increased sample throughput. His demonstrated abilities to plan and evaluate projects, manage tasks, and set and accomplish goals for himself and the team led to his promotion to Senior Scientist in 2002. During his tenure, Yu-Li also represented OC San as a trusted advisor and technical expert in a variety of professional organizations, including the American Society for Microbiology, American Water Works Association, California Water Environment Association, and others. He also served on the Joint Task Group for the Standard Methods for the Examination of Water and Wastewater, the industry-standard reference manual for analytical methods. While assigned to the General Chemistry section, Yu-Li also took on the role of data reviewer for the team, ensuring the integrity of the compliance data reported to OC San's regulators on a monthly basis. Yu-Li was the go-to person when technical issues arose within the lab. His problem-solving abilities, communication skills, and ability to teach others made him a valued contributor when tough problems arose.

Another career shift for Yu-Li came in 2010, when the laboratory manager assigned him as the Quality Assurance Administrator (QA Admin) for the laboratory. Yu-Li was given the directive to have OC San's laboratory achieve compliance with The NELAC Institute (TNI) Environmental Laboratory Accreditation Standards. The TNI Standard was a much more stringent standard of quality assurance than what California's Environmental Laboratory Accreditation Program (CA ELAP) required of labs at the time. The goal of becoming TNI-compliant was to place OC San's laboratory ahead of the curve in the eventuality that California regulators decided to adopt a more stringent laboratory accreditation standard that was more closely aligned with TNI. Yu-Li was not assigned any dedicated staff members to assist with this monumental effort until 2017, when a part-time Principal Environmental Specialist was assigned to assist Yu-Li. For the first seven years of the assignment, Yu-Li used his organizational savvy and interpersonal skills to cobble together an informal team of stakeholders from throughout the laboratory to drive the organization forward toward TNI-compliance. Yu-Li took the initiative to educate himself in the field of quality management, and to teach others within the laboratory as he gained his own

experience. He had the vision necessary to understand the changes needed for OC San to reach our end goal, and carefully planned a roadmap for the laboratory to achieve National Environmental Laboratory Accreditation Program (NELAP) accreditation. It's impossible to describe in one short paragraph exactly how much effort was involved over the course of several years to accomplish this ambitious goal. Yu-Li's leadership and vision resulted in OC San becoming the first municipal laboratory in California to achieve NELAP accreditation in 2017. OC San was also recognized by CA ELAP as an early adopter of the TNI Standard. The results of Yu-Li's efforts continue to impact the lab to this day, the quality of the data produced by our laboratory under the Quality Management System (QMS) implemented by Yu-Li is undoubtedly better documented and defensible. As the laboratory has navigated challenges such as an updated NPDES permit, dealing with emerging contaminants such as PFAS, or dealing with a global pandemic, the QMS has ensured that the laboratory can deliver consistent, high-quality results even under the most difficult circumstances.

Outside of OC San, Yu-Li displayed a passion for service which exemplifies OC San's core values. Even after leaving UCI for his role at OC San, Yu-Li continued to volunteer his time as an unpaid associate project scientist in the university's Department of Environmental Health, Science, and Policy. In that role, he worked with, influenced, and inspired the next generation of environmental scientists, including a young Ph.D. candidate named Sam Choi, who now is an Environmental Manager at OC San. Yu-Li's career expertise and experience were recognized in 2016 with his certification as a Board-Certified Environmental Scientist by the American Academy of Environmental Scientists. Yu-Li was an active participant in Toastmasters, achieving the ranks of Competent Toastmaster and Competent Leader during his years with the organization. Yu-Li also enjoys playing harmonica, but we try not to hold that against him.

OC San's Honor Wall is meant to recognize past staff for significant contributions to the quality of operations and leadership. Yu-Li Tsai, especially in his most recent role as the laboratory's QA Administrator, has made a lasting impact on how the laboratory operates, and has changed nearly every aspect of laboratory testing, making our data more reliable and trust-worthy. Yu-Li embodies the virtues of excellence and service which the Honor Wall celebrates. His extraordinary contributions to OC San, consistent advocacy for scientific and technological progress, and dedication to teaching and mentoring future generations of environmental scientists make him an exemplary candidate for inclusion on the Honor Wall.

Testimonials from OC San staff

Dr. Sam Choi, Environmental Manager

During the 25 years that I have known Dr. Yu-Li, he has influenced and supported my advancement in both my academic and professional careers. Before working together at OC San, Dr. Yu-Li served as one of my advisors and dissertation committee members at UC Irvine where he introduced me to the wastewater sector and the important research that OC San was doing. I was intrigued, and after graduation my focus was redirected from pursuing academia to working at a wastewater agency. In 2011, I joined OC San and for the next 10 years Dr. Yu-Li was my colleague, mentor, and constant source of inspiration. He provided guidance in all things lab related, through his recommendation I was appointed to serve on the committee for Standards Methods for Examination of Water and Wastewater, he supported me through career advancement opportunities, and he provided endorsements such as when I was pursuing the BCES certification. Dr. Yu-Li will continue to be an inspiration to me and many of us in the lab, and it's truly an honor to recommend him for the Honor Wall at OC San.

Dr. Yiping Cao, Environmental Supervisor

I first came to know Dr, Yu-Li when I read his journal publication on sample extraction for molecular analysis. I then met Dr. Yu-Li in 2007 when I started working at OC San as a guest researcher. Dr. Yu-Li showed me such warmth and kindness as I was starting my career. His persistency and resilience, matched with technical expertise, contributed to many of his distinct and significant contributions to OC San. He is a respected expert in the field with pioneer effort in PCR and 75 peer-reviewed publications. As I proudly enjoy the lasting impact of OC San being an early adopter of a formal quality management system, I am tremendously grateful to Dr. Yu-Li's vision, leadership, persistence, teaching, and mentoring that led to OC San being the first municipal laboratory in California to achieve NELAP accreditation in 2017, several years ahead of most California labs.

Joe Manzella, Environmental Supervisor

I joined the laboratory's Quality Assurance team in 2018. Dr. Yu-Li, as the Quality Assurance Administrator, oversaw the day-to-day activities of the team. In the 3 years I spent working directly with Yu-Li, I learned everything there is to know about managing a laboratory Quality Management System, paving the way for my future roles as the laboratory Quality Assurance Administrator, and eventually as an Environmental Supervisor. The lessons that I learned from Yu-Li continue to shape

my decision-making and problem-solving approach to this day. Not only was Yu-Li technically competent, but he was also a model of professionalism and integrity. He kept his cool in even the most stressful situations, and made sure that staff knew that, whatever might happen, he would be right there with them navigating the challenges together. He was kind, modest, unassuming, and respectful of everyone, from management on down to the newest team member. The OC San laboratory is in a much better place than it was when I joined in 2006, and Yu-Li played a large part in our transformation to a more professional and quality-oriented organization.

Vanh Phonsiri, Senior Scientist

Dr. Yu-Li Tsai has been an invaluable mentor to me throughout my career. Our professional relationship began in 2003 and has continued until 2021, during which I served as a liaison between Analytical Chemistry and Dr. Tsai in his role as a Quality Assurance (QA) Administrator. Over the span of 18 years, I have had the privilege of working closely with Dr. Tsai, who has been an inspirational force in my professional development. Dr. Tsai played a crucial role in helping me develop and implement various quality control protocols related to organic environmental chemistry testing, specifically under the requirements of 40 CFR Part 136. Many of these protocols are still active and serve as essential components of our quality assurance processes today. Under Dr. Tsai's guidance, I learned a significant amount about performing internal audits across all sections of the laboratory. This experience was fundamental in ensuring that we not only adhered to relevant regulations but also met the stringent QA/QC mandates that are vital for our work. As a result of these efforts, we were able to achieve numerous actionable enhancements that have markedly improved the overall QA/QC framework at the OC San Laboratory.

Arturo Diaz, Principal Environmental Specialist

I began working with Dr. Yu-Li in 2001 when he was a scientist in the general chemistry section of the laboratory. When I was hired at OC San as an intern, Dr. Yu-Li was the ultimate mentor that believed in me, supported my professional development and encouraged me to take advantage of all advancement opportunities. In 2017, Dr. Yu-Li's guidance as a QA/QC officer was immeasurable in helping the general chemistry group attain NELAP institute accreditation and setting us up to maintain that high level excellence for years to come. Yu-Li has earned may well deserved accolades while at OC San, but I would like to also recognize him for his humble and approachable personality that did not hesitate to share his wealth of knowledge with all lab personnel.

Tony Pimentel, Principal Environmental Specialist

I began working with Yu-Li in 2002 when he was a Senior Scientist in the General Chemistry section of the laboratory. Yu-Li was our technical expert, and he was a beacon of knowledge for those who had the privilege to work alongside him. He played a crucial role in improvement the Laboratory's Quality Assurance program throughout the years, to the ultimate achievement of acquiring our NELAP accreditation in 2017. He was a consistent mentor, and excellent problem solver. Working with him helped to instill a strong sense of constant improvement and integrity. Always supportive of others professional development and recognition, Yu-Li was a true professional.

Rachel Van Exel, Principal Environmental Specialist

I worked with Yu-Li as part of the lab's QA team from 2017 until he retired. During that time, I saw what a large role Yu-Li played in maintaining the lab's quality assurance system after the previous QA group was dissolved; how he managed to prioritize the critical activities; and how he began the process of preparing the lab for the new national accreditation requirements. Yu-Li was instrumental in sustaining the quality system and ensuring the new QA team was prepared to assume the responsibility upon his retirement.

3/21/2021

Curriculum Vitae

YU-LI TSAI

Personal Data

Citizenship:	U.S.A. (Naturalization in November 1990)
Marital Status:	Married with 3 children
Office Address:	Environmental Laboratory and Ocean Monitoring Orange County Sanitation District 10844 Ellis Avenue Fountain Valley, CA 92708 Phone: (714)593-7482 E-mail: ytsai@ocsd.com
Home Address:	18 Santa Rida Irvine, CA 92606-8874 Phone: (949)786-2507 FAX: (949)786-4267 E-mail: yltsai@cox.net

Education

Ph.D. in Microbiology, August 1986, The Ohio State University.
Dissertation: Chemolithotrophic nitrite oxidation by Nitrobacter: coupling with carbon dioxide fixation for growth and influence of metal ions and inorganic compounds of sulfur.

M.S. in Microbiology, June 1983, The Ohio State University.
Thesis: Chemical and microbiological recalcitrance of chlorinated carbon in water.

B.S. in Biology, June 1977, National Taiwan Normal University, Taiwan, R.O.C.

Honors

Recipient of the National Institute of Health (NIH) Fellowship in Environmental Toxicology, 1990-1991.

Recipient of the Procter and Gamble Fellowship in Environmental Sciences, 1985-1986.

Class leader, Department of Biology, National Taiwan Normal University, 1975-1976.

Outstanding Students Award, National Taiwan Normal University, 1975.

Professional Experiences

December 2010 - present.
Quality Assurance Administrator, Environmental Laboratory and Ocean Monitoring, Orange County Sanitation District, Fountain Valley, California. (Environmental Analysis and Project Management)

December 2002 - December 2010.
Senior Scientist, Environmental Laboratory and Ocean Monitoring, Orange County Sanitation District, Fountain Valley, California. (Environmental Analysis and Project Management)

July 2006 – June 2013
Associate Project Scientist without salary, Department of Environmental and Civil Engineering, University of California, Irvine, California.

October 2003 – June 2006
Assistant Researcher without salary, Department of Environmental Health, Science, and Policy, University of California, Irvine, California. (Environmental Biotechnology)

March 1996 – September 2003.
Assistant Researcher without salary, Department of Environmental Analysis and Design, University of California, Irvine, California. (Environmental Biotechnology)

August 1992 - November 2002.
Scientist, Environmental Sciences Laboratory, Orange County Sanitation District, Fountain Valley, California. (Environmental Analysis)

December 1991 - July 1992.
Principal Laboratory and Research Analyst, Environmental Sciences Laboratory, County Sanitation Districts of Orange County, Fountain Valley, California.

July 1990 - November 1991.
Assistant Researcher, Genetic Ecology, Program in Social Ecology, University of California, Irvine, California. (Funded by U.S. Environmental Protection Agency)

September 1988 - June 1990.

Postgraduate Researcher, Genetic Ecology, Program in Social Ecology, University of California, Irvine, California. (Funded by U.S. Environmental Protection Agency and Electric Power Research Institute)

July 1986 - August 1988.
Postdoctoral Fellow, Department of Molecular and Cell Biology, The University of Connecticut, Storrs, Connecticut. (Funded by U.S. Environmental Protection Agency and Lake Waramaug Task Force, Inc.)

July 1985 - June 1986 .
Research Fellow, Department of Microbiology, The Ohio State University, Columbus, Ohio. (Procter and Gamble Fellowship.)

January 1984 - June 1985.
Research Associate, Department of Microbiology, The Ohio State University, Columbus, Ohio. (Funded by the Ohio Air Quality Development Authority.)

October 1982 - December 1983.
Teaching Associate, Department of Microbiology, The Ohio State University, Columbus, Ohio.
Courses taught: General Microbiology Laboratory,
Food Microbiology Laboratory

July 1982 - September 1982.
Internship, Columbus Division of Water, Columbus, Ohio.

September 1980- June 1982.
Teaching Associate, Department of Microbiology, The Ohio State University, Columbus, Ohio.
Courses taught: General Biology Laboratory,
General Microbiology Laboratory

June 1979 - July 1980.
Teaching Assistant, Department of Biology, National Taiwan Normal University, Taiwan, R.O.C.
Courses taught: General Biochemistry Laboratory,
General Plant Physiology

August 1977 - May 1979.
Lieutenant, Republic of China Army, Medical Service Branch.

Extracurricular Activities

President of Harmonica Association at National Taiwan Normal University, Taipei, Taiwan, 1974-1975.

Professional Memberships

American Society for Microbiology, 1980-2021.
American Water Works Association, 1992-2021.
American Chemical Society, 2005-2021.
Water Environment Federation, 1995-2021.
California Water Environment Association, 1995-2021.
American Association for the Advancement of Science, 1991-2003.
Acid Rain Foundation, 1985-1986.
Northeast Microbiologists: Physiology, Ecology, Taxonomy, 1987-1988.
Canadian Society for Microbiology, 1981-1982.

Committees

Join Task Group, Standard Methods for the Examination of Water and Wastewater, APHA/AWWA/WEF, 1993-present.

Project Advisory Committee, America Water Works Association Research Foundation, 1998-2001.

Grants

1. November 1990 - September 1993. Co-principal Investigator. Rapid molecular techniques for distinguishing human from animal *Escherichia coli*. $300,000. U.S. Environmental Protection Agency.

2. July 1990 - June 1991. Co-investigator. Improvement of bacterial detoxification of hazardous waste. I. Induction and expression of polymeric genes for PCB degradation. $50,000. The University of California Toxic Substances Research and Teaching Program.

3. January 1992 - December 1993. Co-principal Investigator. Development and application of molecular techniques to detect indicator and pathogenic microorganisms in treated wastewater. $454,000. National Water Research Institute.

4. July 1992 - June 1994. Co-principal Investigator. Collaborative national study using molecular techniques to detect hepatitis A virus and virulence factor genes in *E. coli*. $675,000. National Water Research Institute.

5. August 1997 – July 1998. Co-principal Investigator. Differentiation between human and cow fecal pollution in water using PCR on *E. coli* toxin genes. $50,000. U.S. Environmental Protection Agency.

6. February 2002 – January 2004. Co-principal Investigator. Real time PCR detection of human viruses and indicators in water. $480,000. Water Environment Federation Research Foundation.

Patents

1. May 1991. Co-inventor. Environmental Genetic Amplification for Pollutant Detoxification and Mineralization. University of California Patent, Trademark and Copyright Office.

2. September 1992. Co-inventor. Environmental Genetic Amplification for Pollutant Detoxification and Mineralization. UC Case No.: 91-130-1. United States Patent Office.

Certificates

1. April 1993. First Responder Operational. Certificate No.: OR50599. Issued by the Governor's Office of Emergency Services, California Specialized Training Institute, San Luis Obispo, California.

2. February 1994. Incident Commander/Scene Manager. Certificate No.: OR67705. Issued by the Governor's Office of Emergency Services, California Specialized Training Institute, San Luis Obispo, California.

3. October 2001. Competent Toastmaster, Issued by the Toastmasters International, Mission Viejo, California.

4. July 2004. Competent Leader, Issued by the Toastmasters International, Mission Viejo, California.

5. October 2016. Board Certified Environmental Scientist, Issued by American Academy of Environmental Scientist Certification Board, Annapolis, Maryland.

Publications (Refereed Papers)

1. **Tsai, Y.-L.** and O.H. Tuovinen. 1983. Effects of chemical and physical treatments on the stability of halogenated organic compounds in water. Environ. Technol. Lett. 4:469-474.

2. **Tsai, Y.-L.** and O.H. Tuovinen. 1985. Oxygen uptake activity by Nitrobacter spp. in the presence of metal ions and sulfooxyanions. FEMS Microbiol. Lett. 28:11-14.

3. **Tsai, Y.-L.** and O.H. Tuovinen. 1986. Molar growth yield of Nitrobacter agilis in batch culture. Can. J. Microbiol. 32:605-606.

4. **Tsai, Y.-L.,** S.M. Schlasner, and O.H. Tuovinen. 1986. Inhibitor evaluation with the use of immobilized cells of *Nitrobacter agilis*. Appl. Environ. Microbiol. 52:1231-1235.

5. Hurtado, J.E., **Y.-L. Tsai**, and O.H. Tuovinen. 1987. Effect of oxyanions of sulfur on *Thiobacillus ferrooxidans*: ferrous ion oxidation, oxygen uptake, and cytochrome reduction. Curr. Microbiol. 15:111-113.

6. **Tsai, Y.-L.,** and O.H. Tuovinen. 1989. Influence of metals on oxygen uptake, carbon dioxide fixation, and cytochrome reduction in *Nitrobacter agilis*. Toxicity Assessment 4:185-198.

7. **Tsai, Y.-L.,** and O.H. Tuovinen. 1989. Influence of sulfooxyanions on oxygen uptake, carbon dioxide fixation, and cytochrome reduction in *Nitrobacter agilis*. Toxicity Assessment 4:199-207.

8. **Tsai, Y.-L.,** and D.R. Benson. 1989. Physiological characteristics of glutamine synthetases I and II of *Frankia* sp. strain CpI1. Arch. Microbiol. 152:382-386.

9. **Tsai, Y.-L.,** and B.H. Olson. 1990. Effects of Hg^{2+}, CH_3-Hg^{+}, and temperature on the expression of mercury resistance genes in environmental bacteria. Appl. Environ. Microbiol. 56:3266-3272.

10. **Tsai, Y.-L.,** M.J. Park, and B.H. Olson. 1991. Rapid method for direct extraction of mRNA from seeded soils. Appl. Environ. Microbiol. 57:765-768.

11. **Tsai, Y.-L.,** and B.H. Olson. 1991. Rapid method for direct extraction of DNA from soil and sediments. Appl. Environ. Microbiol. 57:1070-1074.

12. Ogunseitan, O.A., I.L. Delgado, **Y.-L. Tsai**, and B.H. Olson. 1991. Effect of 2-hydroxybenzoate on the maintenance of naphthalene-degrading pseudomonades in seeded and unseeded soil. Appl. Environ. Microbiol. 57:2873-2879.

13. **Tsai, Y.-L.,** and B.H. Olson. 1992. Detection of low numbers of bacterial cells in soils and sediments by polymerase chain reaction. Appl. Enivron. Microbiol. 58:754-757.

14. **Tsai, Y.-L.,** and B.H. Olson. 1992. Rapid method for separation of bacterial DNA from humic substances in sediments for polymerase chain reaction. Appl. Environ. Microbiol. 58:2292-2295.

15. Tebbe, C.C., O.A. Ogunseitan, P.A. Rochelle, **Y.-L. Tsai**, and B.H. Olson. 1992. Varied responses in gene expression of culturable heterotrophic bacteria isolated from the environment. Appl. Microbiol. Biotechnol. 37:818-824.

16. **Tsai, Y.-L.,** C.J. Palmer, and L.R. Sangermano. 1993. Detection of *Escherichia coli* in sewage and sludge by polymerase chain reaction. Appl. Environ. Microbiol. 59:353-357.

17. Palmer, C.J., **Y.-L. Tsai**, A.L. Lang, and L.R. Sangermano. 1993. Evaluation of Colilert-marine water for the detection of total coliforms and *Escherichia coli* in the marine environment. Appl. Environ. Microbiol. 59:786-790.

18. Oshiro, R.K., **Y.-L. Tsai**, D.J. Min, and B.H. Olson. 1993. Probes to differentiate human and animal *Escherichia coli*. Advances in Water Analysis and Treatment. AWWA 1992 Proceedings, Toronto, Ontario, Canada. pp.1675-1678.

19. **Tsai, Y.-L.,** M.D. Sobsey, L.R. Sangermano, and C.J. Palmer. 1993. Simple method of concentrating enteroviruses and hepatitis A virus from sewage and ocean water for rapid detection by reverse transcriptase - polymerase chain reaction. Appl. Environ. Microbiol. 59:3488-3491.

20. **Tsai, Y.-L.,** C.J. Palmer, M.T. Yahya, C.D. McGee, and L.R. Sangermano. 1993. Detection of enteroviruses and hepatitis A virus in sewage and ocean water by reverse transcriptase - polymerase chain reaction. Proceedings of the Water Environment Federation 66th Annual Conference and Exposition. 7:115-122.

21. Palmer, C.J., **Y.-L. Tsai**, C. Poszko-Kolva, L.R. Sangermano, G.F. Bonilla, B. Roll, and R.S. Fujioka. 1993. Detection of *Legionella* species in sewage and ocean water in California and Hawaii. Proceedings of the Water Environment Federation 66th Annual Conference and Exposition. 7:123-129.

22. Palmer, C.J., **Y.-L. Tsai**, C.D. McGee, L.R. Sangermano, R.S. Fujioka, and M.D. Sobsey. 1993. Collaborative national study using molecular techniques to detect pathogens in coastal waters. Proceedings of the Water Environment Federation 66th Annual Conference and Exposition. 10:257-266.

23. Palmer, C.J., **Y.-L. Tsai**, C. Paszko-Kolva, C. Mayer, and L.R. Sangermano. 1993. Detection of Legionella species in sewage and ocean water by polymerase chain reaction, direct fluorescent-antibody, and plate culture methods. Appl. Environ. Microbiol. 59:3618-3624.

24. **Tsai, Y.-L.,** B. Tran, L.R. Sangermano, and C.J. Palmer. 1994. Detection of poliovirus, hepatitis A virus, and rotavirus from sewage and ocean water by triplex reverse transcriptase - polymerase chain reaction. Appl. Environ. Microbiol. 60:2400-2407.

25. Lang, A.L., **Y.-L. Tsai**, C. Mayer, L.R. Sangermano, and C.J. Palmer. 1994. Multiplex PCR for detection of the heat-labile toxin gene, and Shiga-like toxin I and II genes in *Escherichia coli*, isolated from natural waters. Appl. Environ. Microbiol. 60:3145-3149.

26. **Tsai, Y.-L.,** B. Tran, and C.J. Palmer. 1995. Analysis of viral RNA persistence in sea water using reverse transcriptase - polymerase chain reaction. Appl. Environ. Microbiol. 61:363-366.

27. Palmer, C.J., M.H. Lee, G.F. Bonilla, B.J. Javier, E.B. Siwak, and **Y.-L. Tsai**. 1995. Analysis of sewage effluent for human immunodeficiency virus (HIV) using infectivity assay and reverse transcriptase - polymerase chain reaction. Can. J. Microbiol. 41:809-815.

28. Parker, S.L., **Y.-L. Tsai**, and C.J. Palmer. 1995. Comparison of PCR generated fragments of

the mcegene from *Mycobacterium tuberculosis, M. avium, M. intracellulare*, and *M. scrofulaceum*. Clin. Diag. Lab. Immunol. 2:770-775.

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