Ritual and Materiality in Buddhism and Asian Religions: Editorial Note

The articles in this special issue originated in the international conference we organized, 'Ritual and Materiality in Buddhism and Asian Religions', hosted by Princeton University in June 2023.[1] The conference was immensely exciting, marking a resumption of in-person academic exchange that had halted owing to the worldwide COVID-19 pandemic. The gathering brought together nearly fifty participants, including a keynote speaker, two discussants, twenty-one panelists, five Princeton University faculty serving as presiders, and twenty graduate attendees. They hailed from Asia, Europe, and North America. The panelists were selected by an organizing committee from more than one hundred applications; graduate attendees were chosen from almost ninety applicants. Criteria for acceptance

---

[1] Funding for the conference was provided by the Glorisun Global Network for Buddhist Studies, in addition to five institutional sponsors at Princeton University: the P.Y. and Kinmay W. Tang Center for East Asian Art; the Humanities Council; the East Asian Studies Program; the Center for Culture, Society & Religion (CCSR); and the Department of Religion. The conference was facilitated by the staff of CCSR, including Jennifer Hemingway, Jenny Legath, and Jeff Guest. Princeton Ph.D. students at the time served as organizers and co-conveners: Kentaro Ide, Sinae Kim, and Junbin Tan. The conference would not have been possible without these sponsors and contributors, and we extend our heartfelt thanks to them all. Of the twenty-two presentations made at the conference, ten are represented in this issue, and some are being published elsewhere. Details about all the presentations are available on the conference website (https://ritualmateriality2023.princeton.edu/).

included quality of research and relevance to the themes of the conference. In addition, we prioritized younger panelists and those who had not recently participated in Princeton-based conferences.

Below, we offer brief perspectives on the ideas animating the conference and provide an analytical introduction to the articles in this issue. The articles themselves are grouped geographically (Mainland China and Taiwan, Japan, Thailand) and within that, arranged in rough chronological order. They are prefaced by our keynote speaker's address (Shufen Liu, 'Arhat Cave Beliefs').

Overall, we aimed for the conference to explore connections between ritual and different forms of materiality, including manuscripts, printed liturgies, paintings, statues, talismans, textiles, other ritual implements and technologies, and bodily engagement. Performance, ritualized actions, and praxis are central to Buddhism and the religions of Asia, and recently, scholarship has begun to appreciate the importance of objects and the human body in ritual. We admit from the outset, however, that the two words *ritual* and *materiality* are fuzzy. Prior to the conference, we did not stipulate any particular definitions. Instead, we assigned responsibility to individual paper-givers to define important concepts in relation to their own work. We also asked that their contributions offer some explicit discussion of one or both of the key terms.

Turning from the 2023 conference to the essays gathered in this issue, one way to demonstrate the interpretive advantages of such key terms would be to generate lines of approach based in indigenous sources (a strategy, in fact, followed by some of the articles in this issue). We might think about the hermeneutical issues raised by Buddhist understandings of relics (*śarīra*), for example. The paradigmatic relics in the history of Buddhism are the bodily remains of Śākyamuni. But relics are hardly limited to being merely post mortem, inert objects. Rather, as John S. Strong has argued, the Buddha's biography can be understood as a story about how, over many lifetimes, enlightened beings prepare their bodies to become relics.[2] Buddhist tradi-

---

[2] Strong, *The Buddha: A Beginner's Guide*, 163–93; see Strong's references (*passim*) to the *Mahāparinirvāṇa sūtra* in its various Pāli, Sanskrit, Chinese, and

tions narrate the special features of the Buddha's physical body, canonized as thirty-two signs (*lakṣaṇa*), signifying his grandeur. Many accounts of the Buddha's demise are careful to quote the directions provided by the Buddha himself about the disposal of his corpse: it should be treated the same way as that of a wheel-turning (*cakravartin*) king. Funeral proceedings and worship include wrapping the body in layers of cloth, enclosing it in an iron vessel, cremating it, collecting and distributing the gem-like remains, and placing them in burial mounds (stūpas) that can be properly venerated. To restate this process in terms drawn from our conference, we could say that relics, which are quintessentially bodily or material objects, must be engaged via appropriate rituals. To paraphrase Stephen C. Berkwitz, 'relics of the Buddha ... must be recognized as valid traces of the Buddha, and their validity is demonstrated' by the same rituals 'that served to connect these objects to the living Buddha who existed previously'.[3]

The concept of materiality is relevant because relics themselves are physical things: they act upon the senses, whether sight, sound, smell, taste, touch, or mental activity. People experience such benefits via their bodies. And ritual (in the sense of repeated, formulaic action) is involved because of the many prescriptions for engaging with relics. Stūpas must be circumambulated in the right direction; the Dharma, as a relic encapsulating the Buddha's power, has to be spoken or inscribed correctly; relics are created and presented through appropriate 'framing' in space and time.[4]

The twin subjects of our conference also grow out of recent disciplinary and interdisciplinary ferment in the humanities.

In Art History, more and more scholars have moved beyond the traditional focus on art to embrace a broader approach that includes visual and material culture. Some scholars, maintaining that visual

---

Tibetan versions. We generally follow Strong in interpreting relics; see *idem*, *The Buddha's Tooth*; *idem*, *The Relics of the Budda*; and Germano and Trainor, *Embodying the Dharma*.

[3] Berkwitz, 'The Buddha's Story Continues', 198. We substitute 'rituals' for Berkwitz's original 'narratives'.

[4] Sharf, 'On the Allure of Buddhist Relics', 81.

culture extends beyond the surfaces of objects, explore the uses of these objects and the perceptions of viewers.[5] Material culture, closely linked to visual culture, refers to 'material, raw or processed, transformed by human action as expressions of culture'.[6] The scope of materiality now includes not only painting, calligraphy, and sculpture, but also banners, cloth used in Buddhist rituals, sacred words woven into embroideries, illustrated ritual manuals, steles commemorating ritual activities, architecture, talismans, and various 'things' associated with altars, temples, and other sacred spaces. All these topics will be further treated in the essays featured in this issue.

A growing interdisciplinary field that integrates materiality and religion, focusing on the complex relationships between objects, art, and belief, now includes expressions such as 'material religion', 'religious visual culture', 'religious materiality', and 'the materiality of religion'.[7] Art historian David Morgan, who primarily focuses on Christian materials, supports anthropologist Webb Keane's idea that 'religions may not always demand beliefs, but they will always involve material forms'. Morgan places materiality and visuality squarely at the center of religion.[8] S. Brent Plate, a specialist in religion and film, identifies four promising themes in expanding the interdisciplinary field: intermediality and transmediality; the visuality and performativity of texts; synopticism; and ephemerality.[9]

---

[5] Ebrey and Huang, 'Introduction', 5–11; see also the questionnaire contributed by nineteen scholars of diverse fields in Alpers et al., 'Visual Culture Questionnaire'. For a classic study on the power of images, stressing a two-way communication between images and beholders, see Freedberg, *The Power of Images*.

[6] Prown, 'Mind in Matter', 6. For more recent studies of materiality in Chinese art, see the on-going series: Wu, ed., Zhongguo caizhi yishu.

[7] For these terms, see Morgan, 'Toward a Modern Historiography of Art and Religion'; *idem*, ed., *Religion and Material Culture*; Plate, ed., *Key Terms in Material Religion*; and the open-access journal *Material Religion*.

[8] Keane, 'The Evidence of the Senses and the Materiality of Religion', 124; cited in Morgan, *Religion and Material Culture*, 8.

[9] Plate, 'The State of the Arts and Religion', 51–62; for more discussion, see Huang, *Picturing the True Form*, 12–15.

The study of materiality also evaluates the relationship between objects and the mind, body, society, culture, and the natural world. Scholars of materiality now address not only visible, tangible objects but also the ephemeral and invisible, including texts and miscellanea hidden in pagodas and statues, transient ritual objects, dismantled ritual spaces, long-gone performative actions, and the mental images visualized by practitioners within the immaterial realm of the psyche.[10] Many well-known paintings or sculptures, once treated merely as representations of icons, are now being re-examined as part of the 'multi-sensory matrix of ritual', as they embody scenarios that illuminate lost ritual activities.[11] Even the natural environment, including the mountains, trees, and water surrounding man-made artifacts, is now considered a meaningful component when exploring the geoaesthetics of materiality and ritual.[12]

Among scholars of Buddhism, materiality has been an explicit topic of discussion for more than twenty years now, although, as shown by the articles assembled in this volume, the field still has much room for growth. John Keischnick's 2003 monograph, *The Impact of Buddhism on Chinese Material Culture*, upended the naïve assumption that Buddhism's interest in emptiness and impermanence amounts to denigrating the concrete world. Instead, demonstrating the complexity of Buddhist attitudes toward materiality, Kieschnick explored important cultural projects (e.g., chairs, rosaries, books, bridges) that flourished in China under the influence of Buddhism. Fabio Rambelli offered a wide-ranging interpretation of the world of

---

[10] Belting, 'Toward an Anthropology of the Image', 51; Freedberg, *The Power of Images*, xxii, 162; Huang, *Picturing the True Form*, 10–12; Morgan, *Religion and Material Culture*, 13.

[11] For a case study of Buddhist paintings, see Bloom, 'Ghosts in the Mists' (for the phrase cited here, see 297); for a case study of the Daoist paintings, see Huang, *Picturing the True Form*, 281–339.

[12] For recent scholarship on Buddhism and environment, taking such theoretical concerns as affordance and geoaesthetics into account, see Moser and Protass eds., *Countless Sands*.

objects in Buddhism.[13] His 2007 book and later essays combine semiotic and materialist approaches, charting changes in both meaning and power up through Japan's medieval period.

The materiality of texts has long been recognized by the discipline of Buddhist studies, notably in Gregory Schopen's 1975 essay on the so-called 'cult of the book' in early Mahāyāna.[14] Such studies interpret sūtras, dhāraṇīs, and other forms of writing not merely as words but as objects of devotion with a life of their own. In more recent decades, other work has explored the religious practices involved in producing Buddhist textual objects.[15] These studies utilize perspectives from the discipline of the history of the book to analyze Buddhist scriptures in a variety of physical formats, ranging from handwritten manuscripts on leaves, bark, paper, and stone, to printed editions.

The other leaky umbrella-term providing cover to these articles is ritual, a category with a long, complicated history in monotheistic religions and a distinct genealogy in the modern academic study of religion. Rather than replaying all those dramas here, we think it would be helpful to point to some of the key definitions of ritual and interventions in the field of religious studies that the articles in this issue undertake.

One aspect of ritual behavior relevant to most of these articles was noted in the first edition of the *Encyclopaedia Brittanica*, published in Edinburgh in 1771. That entry defines ritual as the sequence and style for performing public religious observances. It delineates ritual

---

[13] Rambelli, *Buddhist Materiality*; and *idem*, 'Materiality, Labor, and Signification of Sacred Objects in Japanese Buddhism'. See also Astley and Phillips, 'Guest Editors' Introduction'; and Hirasawa and Lomi, 'Editors' Introduction'.

[14] Schopen, 'The Phrase "sa pṛthivīpradeśaś caityabhūto bhavet" in the "Vajracchedikā"'.

[15] See Berkwitz, Schober, and Brown, eds., *Buddhist Manuscript Cultures*; Campany 'Notes on the Devotional Uses and Symbolic Functions of Sūtra Texts'; Copp, *The Body Incantatory*; Eubanks, *Miracles of Book and Body*; Kapstein, ed., *Tibetan Manuscripts and Early Printed Books*; Lowe, *Ritualized Writing*; Schaeffer, *The Culture of the Book in Tibet*; Teiser, *'The Scripture on the Ten Kings'*; Huang, *The Dynamic Spread of Buddhist Print Culture*.

as 'a book directing the order and manner to be observed in celebrating religious ceremonies...'[16] Writing in a similar vein, anthropologists Sally F. Moore and Barbara G. Myerhoff select six formal properties of ritual that highlight its tradition-affirming features: 1) repetition, 2) acting, 3) 'special' behavior or stylization, 4) order, 5) evocative presentational style or staging, 6) 'collective dimension'.[17] Many articles in this issue draw attention to similarly formal features of performance, including repetition, use of elevated linguistic registers and formulae, drama, and careful assignment of roles to performers, interlocutors, and audience.

The Ph.D. students attending our 2023 conference conducted a session that generated important conclusions and posed new questions focusing on performance and efficacy. According to their formulation, in 'referring to the concept of performance, some papers discussed how performing a ritual enacted convention and actualized symbolic power. Others invited further discussion on dynamic interactions between body and object in rituals ... many papers also investigated what makes rituals "work" (ritual efficacy)'.[18]

Another key idea in the field of ritual studies is *ritualization*. Working independently but converging in some of their theoretical results, Catherine Bell (in 1992) and Caroline Humphrey and James Laidlaw (in 1994) identify this phenomenon as fundamental to social analysis. Broadly speaking, they are interested in how different societies, at different times, demarcate a specific sphere of action as distinct from everyday acts. For Bell, ritualization is 'a way of acting that is designed and orchestrated to distinguish and privilege what is

---

[16] *Encyclopaedia Brittanica* of 1771, cited in Asad, 'Toward a Genealogy of the Concept of Ritual', 56.

[17] Moore and Myerhoff, 'Introduction: Secular Ritual', 7–8; the wording is theirs, with scare quotes in the original. For a similar break-down of 'characteristics of ritual-like activities', see Bell, *Ritual*, 138–70, which lists: 1) formalism, 2) traditionalism, 3) invariance, 4) rule-governance, 5) sacral symbolism, 6) performance.

[18] Quoting from the 'Discussion Guide' (unpublished, 2023) prepared by Kentaro Ide (Ph.D. candidate, Princeton University).

being done in comparison to other, usually more quotidian, activities'.[19] In Humphrey's and Laidlaw's terms, 'The person performing ritual "aims" at the realization of a preexisting ritual act. Celebrants' acts appear, even to themselves, as "external", as not of their own making'.[20]

Many of the articles published in this issue presuppose such an approach toward the definition of ritual action. Rather than pursuing abstract arguments, however, the articles take aim at particular, historically situated examples of ritual and their related material objects.[21] At the same time, the articles use those examples to speak to the broader issues in the study of ritual and materiality discussed above. (As noted above, the articles themselves are arranged in roughly geographical and chronological order. Below, we ignore details of time and place and instead explore their analytical framing.)

Several articles in this volume attend to sense experience, media of expression, and materiality. Kate Lingley develops the concept of materiality, exploring the play of permanence and impermanence in prayers inscribed in stone. Lingley illuminates the contrast between evanescent people and momentary rites on the one hand and statues intended to endure on the other hand. Shufen Liu's article shows how theories about supernatural beings are expressed through material means, including cave-shrines and representations of caves

---

[19] Bell, *Ritual Theory, Ritual Practice*, 74.

[20] Humphrey and Laidlaw, *The Archetypal Actions of Ritual*, 89.

[21] In many ways, the articles in this issue accord with other recent work on ritual in the study of Buddhism. That is, they focus on rituals of specific schools or sects (e.g., Tantra in various cultures, Huayan, Tiantai/Tendai, Chan/Sŏn/Zen) or on particular classes of rituals like monastic ordination, lay feasts, confession, image-consecration, spells, healing, exorcism, defeat of enemies, and death ritual. For specific references classified under these categories, see Teiser, 'Prayer and Buddhism?', 900. Even articles that claim to cover all of Buddhist ritual tend to treat one or two particular types of ritual: Payne's encyclopedia entry ('Ritual') focuses on a specific offering rite, while Sharf's methodological piece ('Ritual') concentrates on *darśan* in Mahāyāna and ritual encounters with the abbot in Zen.

in painting and literary accounts. Wen-shing Chou's essay explores the relation between ritual, art, and political purposes. Chou focuses on the intersection of political and religious concerns in images and their surrounding ritual practices that represented emperors as not only rulers but also monks and deities. Susan Dine's contribution on material networks explains how sounds are represented in visual and textual media. Carolyn Wargula's piece discusses how human hair used to fabricate paintings used in mortuary rituals is related to ritual and soteriology. Chihiro Saka's article considers the different soteriological goals and material possibilities of cloth used in rites addressed to an important deity of the afterlife. Trent Walker's essay thinks through the correspondence between different paratextual elements in ritual manuscripts and the various goals of mortuary ritual.

Other articles are concerned with another dimension of chronology: changes in ritual procedures over time. Jingyu Liu's piece shows how liturgies change in accord with different societal demands. The essay by Keping Wu and Wenxuan Yang analyzes the creation of new models of spirit-mediumship, temple spaces real and imagined, and religious statuary. They relate these changes in material form and ritual modality to the demands of urbanization, secularization, and political pressure.

Some articles engage more directly in theorizing about ritual. Chuck Wooldridge, for example, draws attention to the indigenous concept of cultivation (*xiu* 修) or 'improving and extending through time' as a method for asserting permanence. In this analysis, the native idea of cultivation guides individual practice; from another perspective, the idea solidifies communities and buildings and perpetuates the practical knowledge needed to materially maintain temples. In a related vein, Keping Wu and Wenxuan Yang assess different theoretical models for agency and ritual efficacy. They favor a conceptualization of places, objects, and bodies (including deity statues and living spirit-mediums) that views them all as entangled and co-dependent.

These ten articles draw from written sources spanning history, literature, art criticism, religion, and ethnography. They offer sensitive interpretations of paintings, embroideries, statues, architecture, liturgies, and ritual performances. We believe that, taken together, they

offer lucid, in-depth analysis of sources from East Asia and Southeast Asia that significantly advances the study of ritual and materiality.

Bibliography

Alpers, Svetlana, Emily Apter, Carol Armstrong, et al. 'Visual Culture Questionnaire'. *October* 77 (1996): 25–70.

Asad, Talal. 'Toward a Genealogy of the Concept of Ritual'. In *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam*, by Talal Asad, 55–79. Baltimore: Johns Hopkins University Press, 1993.

Astley, Ian, and Nathalie Phillips. 'Guest Editors' Introduction: Materiality in the Buddhism of Pre-modern Japan'. *Buddhist Studies Review* 39.2 (2022): 165–69.

Bell, Catherine. *Ritual: Perspectives and Dimensions*. New York: Oxford University Press, 1997.

———. *Ritual Theory, Ritual Practice*. New York: Oxford University Press, 1992.

Belting, Hans. 'Toward an Anthropology of the Image'. In *Anthropologies of Art*, edited by Mariët Westermann, 41–58. New Haven: Yale University Press, 2005.

Berkwitz, Stephen C. 'The Buddha's Story Continues: Afterlives of the Relics'. In *The Buddha: A Storied Life*, edited by Vanessa R. Sasson and Kristin Scheible, 197–214. New York: Oxford University Press, 2024.

Berkwitz, Stephen C., Juliane Schober, and Claudia Brown, eds. *Buddhist Manuscript Cultures: Knowledge, Ritual, and Art*. London: Routledge, 2009.

Bloom, Phillip. 'Ghosts in the Mists: The Visual and the Visualized in Chinese Buddhist Art, ca. 1178'. *Art Bulletin* 98.3 (2016): 297–320.

Campany, Robert F. 'Notes on the Devotional Uses and Symbolic Functions of *Sūtra* Texts as Depicted in Early Chinese Buddhist Miracle Tales and Hagiographies'. *Journal of the International Association of Buddhist Studies* 14.1 (1991): 28–72.

Copp, Paul. *The Body Incantatory: Spells and the Ritual Imagination*

in Medieval Chinese Buddhism. New York: Columbia University Press, 2014.

Ebrey, Patricia Buckley, and Shih-shan Susan Huang. 'Introduction'. In *Visual and Material Cultures in Middle Period China*, edited by Patricia Buckley Ebrey and Shih-shan Susan Huang, 1–37. Leiden: Brill, 2017.

Eubanks, Charlotte. *Miracles of Book and Body: Buddhist Textual Culture and Medieval Japan*. Berkeley: University of California Press, 2011.

Freedberg, David. *The Power of Images: Studies in the History and Theory of Responses*. Chicago: University of Chicago Press, 1989.

Germano, David, and Kevin Trainor, eds. *Embodying the Dharma: Buddhist Relic Veneration in Asia*. Albany: State University of New York Press, 2004.

Hirasawa, Caroline, and Benedetta Lomi. 'Editors' Introduction. Modest Materialities: The Social Lives and Afterlives of Sacred Things in Japan'. *Japanese Journal of Religious Studies* 45.2 (2018): 217–25.

Huang, Shih-shan Susan. *Picturing the True Form: Daoist Visual Culture in Traditional China*. Cambridge: Harvard University Asia Center, 2012.

———. *The Dynamic Spread of Buddhist Print Culture: Mapping Buddhist Book Roads in China and Its Neighbors*. Leiden: Brill, 2024.

Humphrey, Caroline, and James Laidlaw. *The Archetypal Actions of Ritual: A Theory of Ritual Illustrated by the Jain Rite of Worship*. Oxford: Oxford University Press, 1994.

Kapstein, Matthew, ed. *Tibetan Manuscripts and Early Printed Books*. 2 vols. Ithaca: Cornell University Press, 2024.

Keane, Webb. 'The Evidence of the Senses and the Materiality of Religion'. *Journal of the Royal Anthropological Institute* 14 (2008): 110–27.

Kieschnick, John. *The Impact of Buddhism on Chinese Material Culture*. Princeton: Princeton University Press, 2003.

Lowe, Bryan D. *Ritualized Writing: Buddhist Practice of Scribal Cultures in Ancient Japan*. Honolulu: University of Hawai'i Press, 2017.

Moore, Sally F., and Barbara G. Myerhoff. 'Introduction: Secular Ritual: Forms and Meanings'. In *Secular Ritual*, edited by Sally F. Moore and Barbara G. Myerhoff, 3–24. Assen: Van Gorcum, 1977.

Morgan, David. 'Toward a Modern Historiography of Art and Religion'. In *Reluctant Partners: Art and Religion in Dialogue*, edited by Ena Giurescu Heller, 16–47. New York: Gallery at the American Bible Society, 2004.

———, ed. *Religion and Material Culture: The Matter of Belief*. New York: Routledge, 2010.

Moser, Jeffrey, and Jason Protass, eds. *Countless Sands: Medieval Buddhists and Their Environments*. Honolulu: University of Hawai'i Press, 2024.

Payne, Richard K. 'Ritual'. In *Encyclopedia of Buddhism*, edited by Robert E. Buswell, Jr., 723–26. New York: Macmillan Reference, 2004.

Plate, S. Brent, ed. *Key Terms in Material Religion*. New York: Bloomsbury, 2015.

———. 'The State of the Arts and Religion: Some Thoughts on the Future of a Field'. In *Reluctant Partners: Art and Religion in Dialogue*, edited by Ena Giurescu Heller, 48–65. New York: Gallery at the American Bible Society, 2004.

Prown, Jules D. 'Mind in Matter: An Introduction to Material Culture Theory and Method'. *Winterthur Portfolio* 17.1 (1982): 1–19.

Rambelli, Fabio. *Buddhist Materiality: A Cultural History of Objects in Japanese Buddhism*. Stanford: Stanford University Press, 2007.

———. 'Materiality, Labor, and Signification of Sacred Objects in Japanese Buddhism'. *Journal of Religion in Japan* 6 (2017): 1–26.

Schaeffer, Kurtis R. *The Culture of the Book in Tibet*. New York: Columbia University Press, 2009.

Schopen, Gregory. 'The Phrase "sa pṛthivīpradeśaś caityabhūto bhavet" in the "Vajracchedikā": Notes on the Cult of the Book in Mahāyāna'. *Indo-Iranian Journal* 17.3/4 (1975): 147–81.

Sharf, Robert H. 'On the Allure of Buddhist Relics'. *Representations* 66 (1999): 75–99.

———. 'Ritual'. In *Critical Terms for the Study of Buddhism*, edited by Donald S. Lopez, Jr., 245–70. Chicago: University of Chicago Press, 2005.

Strong, John S. *The Buddha: A Beginner's Guide*. London: Oneworld Publications, 2009. First published as *The Buddha: A Short Biography*, 2001.

———. *The Buddha's Tooth: Western Tales of a Sri Lankan Relic*. Chicago: University of Chicago Press, 2021.

———. *Relics of the Buddha*. Princeton: Princeton University Press, 2004.

Teiser, Stephen F. 'Prayer and Buddhism? The Supreme Offering'. *Journal of the American Academy of Religion* 90.4 (2023): 892–915.

———. *'The Scripture on the Ten Kings' and the Making of Purgatory in Medieval Chinese Buddhism*. Honolulu: University of Hawai'i Press, 1994.

Wu Hung 巫鴻, ed. Zhongguo caizhi yishu 中國材質藝術 [Chinese Material Art]. 3 vols. Shanghai: Shanghai shuhua chubanshe 上海書畫出版社, 2023–.

STEPHEN F. TEISER, GUEST EDITOR
Princeton University

SHIH-SHAN SUSAN HUANG, GUEST EDITOR
Rice University

DOI: https://dx.doi.org/10.15239/hijbs.07.02.01