

## **Exploring Sundanese Folklore in the Cultural Diversity of the Ciletuh Palabuhanratu Geopark, West Java, Indonesia**



**Erlina Zulkifli Mahmud<sup>1</sup>, Cece Sobarna<sup>2</sup>, Asri Soraya Afsari<sup>3</sup>**

<sup>1,2,3</sup>Department of Linguistics Universitas Padjadjaran, West Java-Indonesia.

**ABSTRACT:** This research article is about the exploration of Sundanese folklore in the Ciletuh Palabuhanratu Geopark which is now also known as the Ciletuh Palabuhanratu UNESCO Global Geopark. It refers to an area along the south-west coast of Sukabumi West Java, Indonesia. The Ciletuh Palabuhanratu Geopark is rich not only with its natural diversity like geodiversity and biodiversity but also with its cultural diversity. This article is made as one of the outputs of the community service done in Waluran village in the Sukabumi regency of West Java. This village is just one tiny place situated in the vast areas of the Geopark. The problem is that the cultural diversity around the Geopark has not been thoroughly explored yet, including its folklore. Using qualitative method, this research is aimed at exploring the Sundanese folklore specifically the intangible one involving legends and tales through the active participation of the Palapah cultural activist community and the local tour guides. The community service results in the emergence of folklore explored by each target participant from their surrounding area and the majority of them deal with the naming of places called toponym. It can be explored that the geodiversity is reflected in the place names.

**KEYWORDS:** Ciletuh Palabuhanratu Geopark, Indonesia, Sundanese folklore, toponym, Waluran Village, West Java

### **I. INTRODUCTION**

The Ciletuh Palabuhanratu Geopark or simply called the Ciletuh Geopark is an area situated along the south-west coast of Sukabumi regency in West Java, Indonesia. The Ciletuh Geopark which geographically consists of forest and rice fields has expanded from 45,820 hectares to 126,100 hectares now, from two sub-districts to eight sub-districts including Waluran sub-district (Sobarna et al., 2016). The Geopark is well known for the richness of its geodiversity, biodiversity, and cultural diversity therefore efforts to develop any sector such as ecotourism needs the participation not only from the government but also by local communities (Raharjo et al., 2019). Raising awareness in the local communities to participate in preserving the geodiversity, the biodiversity, and the cultural diversity in the Ciletuh Geopark is urgently needed. This is one of the purposes of carrying out the community service in one of the areas called Waluran village.

Waluran village which is in Waluran sub-district of Sukabumi regency, West Java, Indonesia is selected to be the place where the community service called PPM '*Pengabdian Pada Masyarakat*' is implemented due to the fact that it is more unique than other areas. The uniqueness of this place is that this is the only area which does not directly face to the sea but it is surrounded by hills. It is implied that the different geographical condition creates a different culture owned by the local communities there. The community service is to assist the target community consisting of the community of cultural activists by the name of **Palapah** and the local tourist guides in understanding the importance of a folklore as a resource of cultural diversity in the Geopark. The Palapah community actively engaged in the field of culture either in traditional arts, dances, *pencak silat* martial arts, or in handicrafts and culinary.

Based on the condition mentioned before, the implementation of the community service in Waluran village is the phenomena in the societies which show a lack of awareness particularly the cultural potentials there and one of them is folklore. It is admitted that the community has not yet explored the folklore existed in the area that up till now are still believed by the societies. The folklore is the important part of the cultural richness of oral tradition. It can also have a function as the identity of the society in the area. The preservation of folklore is an effort to maintain the wealth of local cultural treasures (folklore) and this leads to the preservation of global cultural diversity of the Ciletuh Geopark.

### **II. LITERATURE REVIEW**

Since 2015 when the Ciletuh Geopark was officially inaugurated as the Ciletuh National Geopark, scientists of various fields from around the area as well as from other parts of Indonesia have been taking place in giving opinion and suggestion to the government and to the societies there as their efforts participating in building and developing the Geopark through the publication of their research like book and journal articles. In 2016 there was a publication of a research article proposing the participation of

## Exploring Sundanese Folklore in the Cultural Diversity of the Ciletuh Palabuhanratu Geopark, West Java, Indonesia

the local community dealing with geotourism (Darsiharjo et al., 2016). And the more researches took place after 2018 when Ciletuh National Geopark has become the Ciletuh Palabuhanratu UNESCO Global Geopark. A book regarding the cultural diversity with the title *Keragaman Budaya Geopark Ciletuh – Palabuhanratu* was published in 2018 (Sobarna et al., 2016). In the same year, the research article about the community based-ecotourism management to ensure the well-being of the local communities was published (Raharjo et al., 2019). The next research focusses on one of tourist destinations of the Geopark namely Panenjoan located in Ciemas sub-district (Wibowo, 2019). Then there is a research article on ethno-literacy based-culture and tourism in Tamanjaya village (Widiyanto et al., 2018). The following year in 2019 there was a research article discusses on the form of legal protection needed by the Sukabumi Regional government concerning the Ciletuh Palabuhanratu National Geopark (Siregar et al., 2019). The second one of the same year was a research article on the implementation of the policy of West Java province dealing with tourism area in the Ciletuh Geopark (Putri et al., 2020). The latest one is a research article on digitalization information on a specific tourist destination of the Ciletuh Geopark namely Kasepuhan Sinar Resmi (Erfini et al., 2022). So far there has not yet been any research specifically dealing with the exploration of folklore as the cultural potential of the Ciletuh Geopark.

Folklore is a part of a culture, a collective one which is passed down from generation to generation mostly in an oral form (Endraswara, 2013). As the folklore passes down orally, the spread of it is limited to certain areas. It has a deployment orientation limited to specific area and the folklore contains local wisdom as well as regional pride concerned (Riyani & Ramazan, 2020). However, by documenting folklores in written form like in a book, and the folklore is translated into some target languages, the values of the culture represented in the folklore can be globally spread (Zulkifli Mahmud et al., 2022). Folklore is usually used to tell stories, to explain a process, to explain a cause and effect in the form of narratives both real and imaginary. When talking about folklore we do not try to find out whether the content of it is true or not as it can be real as well as imaginary. Folklores as an oral tradition are not just stories as they have a function and purpose. The main purpose of the folklore is to describe an experience, event, or events in a form of a story (Hasibuan, 2018). A folklore is closely related to the society where it is created. Since folklore is something the society believe in then it reflects the identity of the society. It is in line with Sobarna's opinion that a society in this life cannot be separated from the world of folklore and folklore as part of human life develops along with the times, in fact it can be said that the folklore can reflect human life in its era (Sobarna, 2013). It is therefore, the name places may be changed.

Folklore as a form of story and history involves myth, legend, and tales, and the naming places is one of it. It is strengthened by an opinion given by Danajaja that place names are traditionally passed down through folklore (Danandjaja, 1995). The naming places in folklore is called toponym as stated in Segara's that the pattern of naming place can be motivated by geographic elements, biological element, socio-historic as well as folklore (Segara, 2017). Even though it is only a name, it actually deals with the cultural perspective of the surrounding communities as it is a part of identity formation processes (Sobarna et al., 2018). The study of naming in folklore is called onomastics and the naming includes various things such as, street, people, food, fruit, plants, and place.

### III. METHODOLOGY

This research uses qualitative method as it does not involve quantity but it uses words. It is a method for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014). In order to embody the community service activity of exploring folklore as a source of cultural diversity in the Ciletuh Geopark area, based on the number of targets namely twenty members of Palapah, the community of cultural activists and the local tour guides, the techniques of collecting data are as follow: (i) giving material about folklore in general (the forms of folklore, the types of folklore, the functions of folklore) in offline folklore training preceded by asking questions to the participants as an initial evaluation ; then (ii) describing folklores from all over the world including Sundanese folklore; (iii) explaining the similar and the different characteristics between the world folklore with Sundanese folklore; (iv) interviewing each participant regarding the material given, (v) doing focus group discussion regarding the existence of local folklore; and the last technique is (vi) the writing of folklore by the participants. This activity began with the following activities: (i) discussing world folklore material, (ii) comparing the world folklore and the Sundanese folklore, (iii) exploring local wisdom, (iv) discussing folklore and its forms, functions of folklore, collecting folklore, and (v) giving offline folklore training, as well as (vi) giving questions to participants as the final evaluation. The data are studied using the study of folklore and toponym.

### IV. RESULT AND DISCUSSION

From the activity of exploring folklore in the Ciletuh Geopark given as parts of the community service, there are fourteen responses of folklore collected and provided by the Palapah cultural activists and the local tour guides. Most of them still focus on the origins of place names called toponym. The origins of place names involve the name of a waterfall, a cave, a river, an area, and the name of a wellspring as shown in the table 4.1 below.

Table 4.1. The Objects of Place Names (Toponym) in the Ciletuh Palabuhanratu Geopark

No.	Objects of Toponym	Quantity
1	Waterfall	4
2	Area/Location	2
3	Cave	1
4	River or Stream	3
5	Wellspring	1

As the existence of waterfall in the Ciletuh Palabuhanratu Geopark is not only one but ten, the folklore of name places is focussed more on this section. What have been collected are four folklores of the naming of waterfall (the toponym of waterfall): (i) **Curug Cinta** (the Love Waterfall), (ii) **Curug Gerong** (the Mini Cave Waterfall), (iii) **Curug Pengantin** (the Bridal Waterfall), (iv) **Curug Anjing** (the Dog Waterfall). The folklores that are discussed elaborately next are only the three of them as they have not been listed in the book of *Keragaman Budaya Geopark Ciletuh* as one of the references of this research. The next folklores regarding the naming of area or location collected are (i) **Ciletuh**, (ii) **Kiara Payung**, and (iii) **Batu Bubut**. There are two folklores discussed out of the three: **Ciletuh** and **Kiara Payung**. Then there is one folklore regarding the naming of cave: **Gua Monyet** (the Monkey Cave). There are also two folklores regarding the naming of river or stream as follow: (i) **Cipiteuk** and (ii) **Wahangan Cibereum Cikaso**. The last folklore is the naming of wellspring, **Cisumur**. Not all folklores are discussed in this research article due to some reasons: (i) the folklore has been mentioned and discussed in the previous researches or publication; (ii) the information in the folklore has not been completed yet. From the eleven folklores collected, some are written in a detail information but some others are not, so these need to be completed with more detailed information.

#### 4.1 The Folklore of the Name Places (Toponym).

##### A. The Naming of Waterfall.

**Curug Cinta** (Collected by Mawi Gunawan)

Curug Cinta is located in Cipondok Village, Waluran sub-district. In the Sundanese language, the word “*curug*” means waterfall and “*cinta*” means love. It is said that the story began with a love story of a girl whose name is Nyai Cantring Manik. The girl would be matched with one of the group of people hidden in the jungle who were fighting for the independence of Indonesia, like guerrillas called *gerombolan*. The girl was not ready and refused to be married. But unfortunately she could not do that so she ran away and she was chased by the members of the *gerombolan*. She kept running until she reached a river called Cukrukan river. It was in one part of the river that she found a waterfall. The girl was safe there and she liked the place so much. One day, a man came to the place. The man met the girl. They both fell in love with each other. Nyai Cantring Manik finally found her true love. Since then, the people around the area named the waterfall Curug Cinta, the Love Waterfall.

**Curug Pengantin** (Collected by Trisni Sri Wahyuni)

This folklore is about the name place of a waterfall too. It is said that there was a newly married couple who came to a waterfall that is located in Ciwaru village of Ciemas sub-district. The newly married couple were so happy that they took a picture here and there. They were so absorbed with their happiness that they were not aware when suddenly came a torrent from the waterfall so fast that they were accidentally carried away by the torrent. The flow of the water from the waterfall was so huge and fast that they were not able to save themselves. Finally, the newly marriage couple died because they could not survive in the torrent. Since that incident the waterfall was given the name of Curug Pengantin ‘the Bridal Waterfall.

**Curug Gerong** (Collected by Muhammad Umar Maulana)

Geographically this waterfall has three levels or steps. On the first level, this waterfall has a tunnel like a mini cave. It is said it has been used as a hiding place for the elders. Now that is what makes this waterfall called Curug Gerong. The word “*gerong*” in the Sundanese language means tunnel.

On the third level or step, there is a basin where it can be observed the existence of palm prints at the base of the basin. It is believed that if we can dive and touch the palm of that hand all our wishes can come true.

##### B. The Naming of River or Stream

**Ciletuh** (Collected by Endra)

This is a short folklore about the name place, Ciletuh. In the Sundanese language the word “*ci*” from “*cai*” means water that can refer to a river or a stream. Ciletuh is a river which stretches from Waluran sub-district to Ciemas sub-district which flows to Ciletuh bay in Palangpang beach, surrounded by rock cliffs, Ciemas sub-district. The river is named the Ciletuh river because the water of the river will never be clear but it will continue to be murky. The murky water is caused by the flows of water from eight waterfalls.

## Exploring Sundanese Folklore in the Cultural Diversity of the Ciletuh Palabuhanratu Geopark, West Java, Indonesia

### **Cipiteuk** (Collected by Farhan Adi Putra)

This folklore is about the name place, Cipiteuk. There are two versions concerning the name place, Cipiteuk. Cipiteuk is actually an area that has a river and it is said that the flow of the river is in the form of an *iteuk* 'stick'. This is the one version why this river is called Cipiteuk. It consists of two words: (i) "ci" which means water or river and (ii) *iteuk* which means stick. This river is located in the village of Tanjung Sari, Caringin Nunggal sub-district.

In addition to the river which is in the form of *iteuk* 'stick', Cipiteuk also has a historical story. This is the second version of the name Cipiteuk. In this version the name Cipiteuk deals with two words: (i) *ci* which means water and (ii) *piteuk* which means big fly. In ancient times there were many people herding buffalo in the Cipiteuk river area and every buffalo which was there always had *piteuk* 'big fly' on his back. It is therefore, the area and its river is named Cipiteuk.

### **Wahangan Cibereum Cikaso** (Collected by Feni Solihah)

It is said that during the Dutch colonial era, people who would like to cross from the east of Cikaso, they had to pass a river to go to the West Cikaso. This was for anybody including the Dutch colonialists. They had no other options. This condition was taken for granted by the Indonesian warriors who were fighting for Indonesian independence and who hid themselves in the jungle to do a sudden attack whenever possible. People call them *gerombolan*. In the middle of their way, far from anywhere the Dutch colonialists were ambushed and killed. The Dutch colonialists were slaughtered. Their bodies were thrown up to the river that the water of the river became full of blood. This made the water of the river red as the Dutch colonialists who were slaughtered there were so many. For this reason, people there called the river the *Cibereum* river which means the red river. In the Sundanese language, the word "*beureum*" refers to red colour.

### **C. The Naming of Area/Location**

#### **Kisah Kiara Payung** (Collected by Uje)

This folklore is about the origins of the name place, *Kiara Payung*. It is said that around 1900s there was a big tree called *Kiara* tree. The tree was so big that it covered the village road like a giant umbrella. It is therefore it is called *Kiara Payung* (*payung* 'umbrella') which means *Kiara* which is slanted/covering the road. Besides the uniqueness of its shape, it is said that the *Kiara* tree is mystical so that at that time there were still people who kept offerings under the *Kiara* tree.

According to the testimony of one of the elders, the guardian of the *Kiara* was a large snake. It is believed that the size of the snake is as big as a coconut tree. When one of the snakes was killed by a villager. So angry the other snake was due to what the villager did, the house of the villager who killed the snake was attained by another big snake. This is a story about *Kiara Payung* from a reliable source. Up till now, the rest of the story about a hole where the snake stayed is still there.

### **D. The Naming of Wellspring**

#### **Cisumur** (Collected by Insanul Kudus)

According to history or stories from the elders, the origin of the word *cisumur* is from the seven wells. In the area of Ciletuh Palabuhanratu Geopark, there were seven wells as springs. The seven wells are (i) Ciseupan, (ii) Cikaret, (iii) Cigede, (iv) Cioban, (v) Ciogon, (vi) Cisumur, (vii) Leuwi Talang. Of the seven wells, now, only a few springs remained and the remaining springs were called Cisumur. The word Cisumur consists of two words: (i) "ci" or "cai" which means water and (ii) "sumur" which means well. So the name Cisumur refers to the water from the well. And until now people still call the wells with the name Cisumur.

There is one spring among the seven wells called Cioban spring that remains with the clear water also has a distinctive taste, the sweetish taste. This water source is one of the springs that does not dry up even in the dry even though the water is continuously collected and brought to several other villages as the water supply to people in the areas.

### **4.2 The Folklore about A Place (Folktales/Legends)**

Other three responses are not place names or toponym but they are still folklores which are passed down from generation to generation by oral stories. The folklores are about places that are still believed by the societies around the area as something real and true. The first one is written as *Sejarah Jembatan Cikarang Ciracap* (the History of Cikarang Bridge, Ciracap) by Anggun Solehudin. It is about the history of Cikarang bridge in Ciracap sub-district. Up till now the bridge which crosses the Cikarang river is the longest bridge in the Ciletuh Palabuhanratu Geopark. People believe that there are crocodiles living in the river and the crocodiles are of two kinds: the real crocodile and the incarnation of daemon in the crocodile bodies which people called *buaya jadi-jadian*. The second is about a place which is called the *Grave of Eyang Santri Dalem and Cikahuripan* and this folklore is collected by Ariel Adiyansah. It is said that Cikahuripan village which is located in Cigansa Surade, Cisolak sub-district is divided into two parts and the distance between the two is far enough. The first area is known as a bathing place of Islamic Jinns. And it is in this area that a grave of *Eyang Santri Dalem* located. *Eyang Santri Dalem* is a *wali Allah*, a very religious man from a *pesantren* 'Islamic boarding school' who had given all his life only for Islam religion. People believe it is a sacred place that there are many people coming to pray. The third folklore collected is *Saronge Ki Adhar*; it is about a cave in the Cisumur village, Pasir Malang. It is told by an elder of Cikokosan, Ki Surya. He witnessed the beginning of Indonesia as an independent country.

## Exploring Sundanese Folklore in the Cultural Diversity of the Ciletuh Palabuhanratu Geopark, West Java, Indonesia

According to him, the cave was once used as a meeting place of warriors of Indonesia called *orang leuweung* (people who lived in the jungle) who were also called *masyarakat gerombolan* (this refers to the warriors who stayed in the jungle in groups). Up till now, the cave is believed to keep an unsolved mystery as inside the cave, there is a rock table or a very big rock shaped like a table. This third folklore is submitted by Teguh Nusantara.

### CONCLUSIONS

The implementation of the handing out the folklore material was carried out based on counselling activities and practices. The emphasis of an extension activity was more towards activity and skills development. It can be concluded that the involvement of the participants in the activity of providing folklore material was carried out actively. Out of twenty participants, there are fourteen responses of folklore dealing with the naming of places. The fourteen responses of folklore represent the geodiversity of the Ciletuh Geopark as the objects of the folklore cover the names of waterfall, river, cave, area, wellspring, and an old bridge. It shows that there is an inter-correlation between the cultural diversity in this case the folklore and geodiversity, the richness of nature there.

It is expected that the next research in the community service activity will result in more responses and in more forms of folklore such as the myth and tale. To get the objectives as targeted, it is expected that the next research will involve more participants still in the same area because it has not been totally explored yet.

### REFERENCES

- 1) Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Sage Publication.
- 2) Danandjaja, J. (1995). A Comparative Study of Japanese and Indonesian Folklores. *Southeast Asian Studies*, 33(3), 484–496.
- 3) Darsiharjo, Supriatna, U., & Saputra, I. M. (2016). Pengembangan Geopark Ciletuh Berbasis. *Jurnal Manajemen Resort Dan Leisure*, 13(1), 55–60. file:///C:/Users/user/AppData/Local/Temp/2036-3625-1-SM.pdf
- 4) Endraswara, S. (2013). *Folklor Nusantara: Hakikat, Bentuk, dan Fungsi*.
- 5) Erfina, A., Puspatarini, R. A., Ijudin, T. A., Haditua, P., Siregar, R., Studi, P., Informasi, S., & Arsitektur, J. (2022). Digitalisasi Informasi Kampung Adat Kasepuhan Sinar Resmi Unesco. *Jurnal Teknik Informatika Dan Sistem Informasi*, 9(3).
- 6) Hasibuan. (2018). *Translation Techniques of Cultural Elements in Anak Na Dangol Ni Andung: A Mandailing Folklore*. Universitas Sumatera.
- 7) Putri, S. M., Deliarnoor, N. A., & Nurasa, H. (2020). Implementasi Kebijakan Pemerintah Provinsi Jawa Barat Tentang Pengembangan Kawasan Geopark ( Studi Pada Pemerintah Kabupaten Sukabumi Dalam Pengembangan Kawasan Pariwisata Geopark Ciletuh 2019 ). *Jurnal Moderat*, 6(1), 171–187. <https://jurnal.unigal.ac.id/index.php/moderat>
- 8) Raharjo, S. T., Apsari, N. C., Santoso, M. B., Wibhawa, B., & Humaedi, S. (2019). Ekowisata Berbasis Masyarakat (Ebm): Menggagas Desa Wisata Di Kawasan Geopark Ciletuh-Sukabumi. *Social Work Journal*, 8(2), 158. <https://doi.org/10.24198/share.v8i2.19591>
- 9) Riyani, M., & Ramazan. (2020). Kearifan Lokal Dalam Folklor Asal Usul Kota Langsa. *Jurnal Ilmiah Kependidikan*, 11, 2087–9385. <http://jurnal.umk.ac.id/index.php/RE>
- 10) Segara, N. B. (2017). Kajian Nilai Pada Toponimi Di Wilayah Kota Cirebon Sebagai Potensi Sumber Belajar Geografi. *Jurnal Geografi*, 14(1), 54–67. <https://doi.org/10.15294/jg.v14i1.9777>
- 11) Siregar, H. F., Nurhayati, N., & Nurwulan, S. (2019). Analisis Perlindungan Hukum Terhadap Geopark Nasional Ciletuh Sebagai Kawasan Geowisata Di Kabupaten Sukabumi Provinsi Jawa Barat. *Jurnal Surya Kencana Satu: Dinamika Masalah Hukum Dan Keadilan*, 10(1), 15. <https://doi.org/10.32493/jdmhkdmhk.v10i1.3173>
- 12) Sobarna, C. (2013). Folklor Sebagai Sumber Daya Toponimi Masyarakat Sunda. *Prosiding Seminar Nasional Himpunan Sarjana Kesustraan Indonesia (HISKI)*, 249–256. <http://journal.fib.uho.ac.id/index.php/hiskisultra/article/view/187>
- 13) Sobarna, C., Gunardi, G., & Wahya, W. (2018). Toponimi Nama Tempat Berbahasa Sunda di Kabupaten Banyumas. *Panggung*, 28(2). <https://doi.org/10.26742/panggung.v28i2.426>
- 14) Sobarna, C., Risagarniwa, Y. Y., Gunardi, G., Mahdi, S., & Kadir, P. M. (2016). Keragaman Budaya Geopark Ciletuh-Palabuhanratu.
- 15) Wibowo, I. N. P. (2019). Strategi Pengembangan Aspek Lingkungan di Titik Pandang Panenjoan dengan Berlandaskan Konsep Pariwisata Bertanggung Jawab. *Tourisma: Jurnal Pariwisata*, 1(2), 100. <https://doi.org/10.22146/gamajts.v1i2.49297>
- 16) Widiyanto, R., Saprudin, S., & Imswatama, A. (2018). “Geopark Ciletuh” Culturediversity (Etnoliterasi Berbasis Budaya Dan Pariwisata) Sebagai Media Dan Sumber Pembelajaran Ips Di Sd. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 2(1), 43–51. <https://doi.org/10.20961/jdc.v2i1.15324>

- 17) Zulkifli Mahmud, E., Ampera, T., & Zakaria, M. M. (2022). the Representation of Sundanese Folklore Nyi Mas Sanghyang Dewi Sri in Three Languages. *Sosiohumaniora*, 24(2), 199.  
<https://doi.org/10.24198/sosiohumaniora.v24i2.35494>
- 18) The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section. Number the reference items consecutively in square brackets (e.g. [1]).
- 19) Ding, W. and Marchionini, G. 1997 A Study on Video Browsing Strategies. Technical Report. University of Maryland at College Park.
- 20) Tavel, P. 2007 Modeling and Simulation Design. AK Peters Ltd.
- 21) Sannella, M. J. 1994 Constraint Satisfaction and Debugging for Interactive User Interfaces. Doctoral Thesis. UMI Order Number: UMI Order No. GAX95-09398., University of Washington.
- 22) Brown, L. D., Hua, H., and Gao, C. 2003. A widget framework for augmented interaction in SCAPE.
- 23) Y.T. Yu, M.F. Lau, "A comparison of MC/DC, MUMCUT and several other coverage criteria for logical decisions", *Journal of Systems and Software*, 2005, in press.
- 24) Spector, A. Z. 1989. Achieving application requirements. In *Distributed Systems*, S. Mullende
- 25) Forman, G. 2003. An extensive empirical study of feature selection metrics for text classification. *J. Mach. Learn. Res.* 3 (Mar. 2003), 1289-1305.
- 26) Fröhlich, B. and Plate, J. 2000. The cubic mouse: a new device for three-dimensional input. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*.
- 27) Bowman, M., Debray, S. K., and Peterson, L. L. 1993. Reasoning about naming systems.



There is an Open Access article, distributed under the term of the Creative Commons Attribution–Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.