I am very honored to receive the Seismological Society of Japan Award. I would like to express my deepest gratitude to all the people who recommended this research, to the selection committee members, to predecessors in this area, and to my cooprerative colleagues in Japan, and colleagues in the Earthquake Prediction and Analysis Group of the Institute of Statistical Mathematics (ISM) for their cooperation and support over the years.

Statistical seismology is a traditional field that originated in Japan, and there have been many studies on the statistical properties of seismic activity since the Meiji era (1868-1912). The research in Japan on aftershock statistics is one of the best in the world, and the works by Prof. Utsu are particularly thorough; he derived a number of important empirical rules of thumb using inventive statistical graphs, including changes in the number of earthquakes, details of earthquake size distributions, and spatial aftershock distributions.

I have pursued a method of predicting the incidence and performing statistical analysis directly from the earthquake time series. The background is in the field of event series, or stochastic point processes. Especially important is the concept of the conditional intensity function, which is the prediction rate of sudden events. Thus, for example, the ETAS model consists of empirical rules of aftershocks and self-similarity. The ETAS model can be obtained by the maximum likelihood method, and statistical incompatibilities of seismic activity can be detected with high sensitivity. The spatio-temporal ETAS model is further adapted to the seismic activity in space-time, consisting of the scale law of aftershock area with respect to magnitude and the inverse power decay of aftershocks in far-field.

The richer the data, the more pronounced the regional characteristics and heterogeneity of earthquake occurrence patterns, and the more difficult it becomes to grasp them uniformly. Deepening the study of seismic activity would be difficult without the help of a hierarchical Bayesian method that solves inverse problems in a flexible model with many parameters. The hierarchical spatio-temporal ETAS model is just a first step.

Prof. Aki's lecture report in Zisin (Journal of Seismological Society of Japan, Series II), entitled "Some Problems in Statistical Seismology," clarifies how to advance the research direction for the ultimate goal of earthquake prediction, and also introduces a lot of research and literature on the correlation between earthquake activity and changes in geophysical phenomena. These were also constraints of the times as of 1956, but there is room for many of them to be pursued meticulously in terms of predictions. Nowadays, the physics of earthquakes is steadily being elucidated, and it is expected that we should make efforts to improve the prediction power by modeling the conditional

intensity function based on the abundant earth science data. The search for quantitative causality in complex systems of what factors and how they depend on what factors, requires physical considerations and statistical insights.

Once again, I would like to express my heartfelt gratitude for this award and wish the Seismological Society of Japan much success in its development.