

# SAKAMOTO LAB.

## [Sound Environment in Architecture and City - Prediction / Measurement / Assessment -]

Department of Human and Social Systems

Environmental Acoustic Engineering

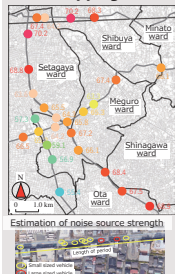
Department of Architecture,  
Graduate school of Engineering

<http://www.acoust.iis.u-tokyo.ac.jp>

Sounds surround our lives. Sakamoto laboratory treats various issues on acoustic control, measurement, prediction and assessment, in order to realize better sound environment. Evaluation and measurement of acoustical environment will be introduced.

- ◆ **Room acoustic design** : Acoustical design of auditoria, Speech privacy, Classroom acoustics
- ◆ **Building acoustics** : Sound insulation of building façade
- ◆ **Acoustic measurement** : Impulse responses, Sound insulation, Sound reflection and absorption
- ◆ **Development of prediction methods** : Wave-based numerical analysis
- ◆ **Development of sound field simulation** : 6 channel recording-reproduction system
- ◆ **Environmental noise** : Prediction model of Road Traffic Noise, Railway Noise, Wind Turbine Noise, Equipment Noise

### Noise mapping method



Accurate and efficient methods for creating environmental noise maps that are effective for environmental management are examined separately for noise source strength and noise propagation within Building (residential houses) area. For noise source model, we propose a usage of aerial photograph data.

**Predict**  
**Measure**  
**Assess**  
**Reproduce**

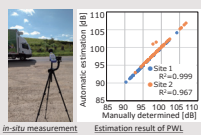
### Road traffic noise modeling

Development of automatic data processing

- ▶ Measurement
  - Video camera
  - Sound level meter
- ▶ Auto processing
  - Event detection
  - Running speed
  - Vehicle type classification
  - Sound power level



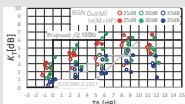
Image processing



### Subjective evaluation of noise with tonal components



Tonal components included in wind turbine noise (WTN) or equipment noise may increase the annoyance to the noise. Auditory experiments are conducted to know how the tonal frequency and strength and background noise characteristics affect the subjective perception such as loudness and noisiness.



### Audio-visual interaction for environment evaluation

Three-dimensional sound field reproduction system using 6-channel loudspeakers has been built in anechoic room. Audio-visual interaction on evaluation of environment is investigated using combination system of 6-ch. loudspeakers and dome projector.



Audio-Visual reproduction system

The effect of visual stimuli on the subjective evaluation were studied under various sound sources and listening situations.

