

Claude Elwood Shannon April 30, 1916 – February 24, 2001

$$f(t) = \sum_{n=-\infty}^{\infty} f(n) \frac{\sin \pi (t-n)}{\pi (t-n)}$$

$$f(t) \underbrace{(Sf)(n)}_{\text{Sampler}} \text{Low-pass filter} f(t)$$

$$(Sf)(t) = \sum_{n=-\infty}^{\infty} f(n) \ \delta(t-n)$$



Sampling Theory in Signal and Image Processing (STSIP) – Special Volume Shannon Centennial Volume with Papers from SAMPTA 2015

Preface

This volume of *Sampling Theory in Signal and Image Processing* (STSIP) is in celebration of the Claude Elwood Shannon (April 30, 1916 – February 24, 2001) Centennial Year. It includes papers from the Sampling and Signal Processing community and papers that are extensions of conference papers from the SAMPTA 2015.

Seminal ideas are triggered by amazing insights, often derived from straightforward ideas. Many lead to important developments far beyond what was envisioned. The ideas of Shannon on sampling and signal processing, entropy, information theory, and cryptography are examples of such seminal ideas.

As we celebrate this centennial, we marvel the rich extent of mathematical research and significant applications that Shannon's ideas have inspired, from the mathematics hiding in compact discs and videos, to modern advances in signal and image processing, compressed sensing, machine learning, real and complex analysis, applied and computational harmonic analysis, geosciences. inverse problems, optics, computational neuroscience, etc. We have witnessed many breakthroughs in some of these areas in the past two decades, and more is yet to come – and we hope STSIP will be there to report on the future advances.

The first paper in this volume is the delightful essay *Claude Shannon – American Genius* by Professor J. R. Higgins, our historian on sampling theory and *expositor par excellence*. The other papers report on major advances in their areas; collectively they explore impressive frontiers of modern sampling theory.

Our wonderful discipline sits at a crossroad. Just as mathematics and engineering used to be driven by mathematical physics, our mathematics and engineering will be motivated by the science of information. The SAMPLING/STSIP/SAMPTA community is in a unique position to contribute to these efforts. Our work provides the tools for advances in a very wide spectrum of areas, from communications, data, and information, to advances in signal and imaging processing, to breakthroughs in medical, social, and political science. We thank all the authors, editors, and referees for their contributions to the success of this project.

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